WARREN NEIDICH

GLOSSARY OF COGNITIVE ACTIVISM

(FOR A NOT SO DISTANT FUTURE)

ARCHIVE BOOKS

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ARCHIVE BOOKS

A
ACCELERATIONISM
ACCUMULATION
ACTIVIST NEUROAESTHETICS
AFFECT
AFFECTIVE LABOR
AFFORDANCE THEORY
AFROFUTURISM
AGENCY
ALGORITHM(S)
ALIENATION
ALT-COGNITIVE ERGONOMICS
ALT-RIGHT
ALT-VISUAL ERGONOMICS
ANARCHY
ANTHROPOCENE
APPARATUS
APOPTOSIS
ARCHIVE
ARTIFICIAL GENERAL INTELLIGENCE
ARTIFICIAL INTELLIGENCE (AI)
ARTIFICIAL NEURAL NETWORKS (ANN)
ARTPOWER
ATTENTION ECONOMY
AUGMENTED REALITY
AUTONOMY
AUTOPOIETIC SYSTEMS
AYAHUASCA

B
BACK PROPAGATION LEARNING (BPL)
THE BALDWIN EFFECT
BEREITSCHAFTSPOTENTIAL OR READINESS POTENTIAL (RP)
BASE AND SUPERSTRUCTURE
BIG DATA
BIG OTHER
BINDING
BIOPOWER
BODY WITHOUT ORGANS (BwO)
BOT
BOTTOM-UP PROCESSING
BRAIN-COMPUTER-INTERFACES (BCIs)
BRAIN FINGERPRINTING
BRAIN WITHOUT ORGANS (BrWO)
BRETTON WOODS SYSTEM
BUZZ

C
CAPITAL
CAPITALIST REALISM
CENTRAL NERVOUS SYSTEM (CNS)
CEREBRAL CORTEX
CEREBRALITY
CIRCULATORY CAPITAL
CLASS CONSCIOUSNESS
CLICKBAIT
COGNIT
COGNITARIAT
COGNITIVE ACTIVISM
COGNITIVE CAPITALISM
COGNITIVE MAPPING
COLLAGE
COMMODITY FETISHISM
THE COMMONS
COMMUNICATIVE CAPITALISM
COMPLEXITY
CONCEPTUAL ART
CONNECTIONISM
CONSUMER NEUROSCIENCE OR NEUROCONSUMERISM
CONNECTOME

CONTINGENCY
CORPUS CALLOSUM
CORTICAL REMAPPING
COSMOPOLITANISM
CREATIVITY
CULTURAL
CULTURAL ATTENTION
CULTURAL CAPITAL
CULTURAL EVOLUTION
CULTURAL MEMORY
CYBORG

D
DATA MINING
DATAISM
DEBT
DECOLONIZING THE MIND
DEEP HISTORY or DEEP TIME
DEEP LEARNING
DEFAULT NETWORK STATE
DEGENERACY
DENDRITES
DÉRIVE or DRIFT
DÉTOURNEMENT
DISCIPLINARY SOCIETY
DISSENSUS
DISTRIBUTION OF THE SENSIBLE/INSENSIBLE (DOSI)
DIVERGENT THINKING
DIVIDUAL
DUENDE

E
EARLY COGNITIVE CAPITALISM
EMBODIMENT AND EMBODIMENT THESIS
EMERGENCE
EMPIRE
ENVIRONMENTAL ENRICHMENT
EPIGENETICS
EPIGENETIC ARCHITECTURE
EPIPHYLOGENESIS
ERGONOMICS
ESTRANGEMENT
EXTENDED MIND
EXTENSIVE SPACE
EXTERIORIZATION
EXTERNALITIES (POSITIVE AND NEGATIVE)
EYE TRACKING

F
FACEBOOK
FAKE NEWS
FINANCIALIZATION
FLEXIBILITY
FLESH
FoMO
FORMAL SUBSUMPTION
FORDISM
4CHAN (PRONOUNCED “FOUR CHAN”)
FRONTAL LOBE(S)

G
GANGLION CELLS
GENDER
GENDERED BRAIN
GENE
GENERAL INTELLECT
GESTALT
GLOBAL NETWORK SOCIETIES
GOOGLE EFFECT
GOOGLE FILTER BUBBLE
GOVERNMENTALITY
GRUNDRISSE

H
HACKER (WHITE HAT)
HEBBIANISM (formerly Hebbinism)
HEBB’S POSTULATE
HETERODOX CULTURAL SYNCHRONIZATION & ORTHODOX CULTURAL SYNCHRONIZATION
HETEROTOPIAS
HISTORICAL AND DIALECTIC MATERIALISM
HYPERREAL
HYSTERICAL SUBLIME

I
IMMATERIAL LABOR
IMPROVISATION
INFORMATION ECONOMY
INFOTAINMENT
INSTAGRAM
INSTITUTIONAL DEPRIVATION
INTENSIVE
INTERNALIZATION
INTERNET OF EVERYTHING (IoE)
INTERNET OF THINGS (IoT)
INTERSECTIONALITY

J
JUNKSPACE

K
KEK

L
LATE COGNITIVE CAPITALISM
LIVE-WIRED BRAIN
LONG-TERM POTENTIATION (LTP)

M
MACHINIC INTELLIGENCE
MASS INTELLECTUALITY
MATERIAL ENGAGEMENT THEORY
MATERIALISM
MEMES
MEMORY
MENTALITÉ
MICROBIOME
THE MIND’S EYE
MIRROR-NEURON SYSTEM
MOORE’S LAW
MORPHOGENESIS
MULTITUDE

N
NATURE
NEGENTROPY
NETWORK MODEL OF BRAIN FUNCTION
NETWORK MODEL OF LABOR
NEURAL ASSEMBLIES
NEURAL CAPITALISM
NEURAL COMMONS
NEURAL CORRELATES OF CONSCIOUSNESS (NCC)
NEURAL DARWINISM
NEURAL DUST
NEURAL ETHICS
NEURAL MATERIALISM
NEURAL PLASTICITY
NEURAL REGRESSION
NEURAL TECHNOLOGIES
NEURAL SUBSUMPTION
NEURAL VARIABILITY AND DIFFERENCE
NEURAL ZOE
NEUROAESTHETIC MODEL
NEUROBIOLOGICAL SUBLIME
NEUROCENE
NEURODIVERSITY
NEUROECONOMICS
NEUROFEMINISM
NEUROMARKETING
NEURON

NEURONAL RECYCLING HYPOTHESIS
NEUROPOWER
NEUROTYPICAL
NODES
NOISE (MUSIC)

O
OCCUPY MOVEMENT, OCCUPY WALL STREET (OWS)
ONE-DIMENSIONAL MAN, ONE-DIMENSIONAL WOMAN
OPAQUE ALIENATION
OPTOGENETICS
ORIGINARY TECHNICITY

P
PANOPTICON
PEOPLE (A/THE)
PEPE THE FROG
PERCEPTION-ACTION CYCLE (PA CYCLE)
PERCEPTRON
PHANTOM LIMB SYNDROME
PHATIC IMAGE
PHENOMENOLOGY
PHI
PIZZAGATE
PLATFORM CAPITALISM
PLURIPOTENTIALITY
POETRY
POLITICAL ECONOMY
POPULISM
POSITIVISM
POST-ANTHROPOCENE
POST-CAPITALISM
POST-FORDISM
POSTHUMANISM
POST-WORKERISM or POST-OPERAISMO
PRECARITY
PRIMARY REPERTOIRE
PROLETARIAT
PSYCHEDELIC DRUGS
PSYCHOGEOGRAPHY
PSYCHOPATHOLOGIES OF COGNITIVE CAPITALISM
PSYCHOPOLITICS

R
RAP
REAL ABSTRACTION
REAL SUBSUMPTION
RECEPTIVE FIELDS
RECUPERATION
REDISTRIBUTION OF THE SENSIBLE AND INSENSIBLE (RE-DOSI)
REENTRY
REGIMES OF TRUTH
RETINA
RHIZOME
RHYTHMANALYSIS
RHYTHMS IN THE BRAIN

S
SALIENCY
SECONDARY REPERTOIRE
SELF-ORGANIZATION
SEXED BRAIN
SHAMAN
SHAMANISM
SIMULACRUM
SINGULARITY or TECHNOLOGICAL SINGULARITY
SIMULTANEITY OF INPUTS
SOCIAL FACTORY (FACTORY WITHOUT WALLS)
SOCIETY OF CONTROL
STATISTICON
SUBALTERN
SUBJECTIVIZATION
SUPERINTELLIGENCE
SUPERORDINATE PRECARIAT
SURPLUS JOISSANCE
SURPLUS VALUE
SURVEILLANCE CAPITALISM
SYNAPSE
SYNCHRONOUS CONVERGENCE
SYNOPTICON

T
TAYLORISM
TEME
TERATOMA
THEORY OF MIND
TRANSPARENT ALIENATION
24/7 (TWENTYFOUR/SEVEN)
TWITTER

U
UMWELT
UNDERCOMMONS

V
VALORIZATION
VARIATION
VIRTUAL REALITY (VR)

W
WORKERISM
WORKING CLASS
WORKING MEMORY

X
XENOFEMINISM

Y
YELLOW JOURNALISM or YELLOW PRESS
YELLOW VEST (GILET JAUNE)
YOLO

Z
ZEITGEIST

INTRODUCTION

Nature builds no machines, no locomotives, railways, electric telegraphs, self-acting mules etc. These are products of human industry: natural material transformed into organs of the human will over **nature**, or of human participation in **nature**… They are organs of the human brain, created by the human hand: the power of knowledge, objectified. The development of fixed **capital** indicates to what degree general social knowledge has become a direct force of production, and to what degree, hence, the conditions of the process of social life itself have come under the control of the **general intellect** and been transformed in accordance with it.

—Karl Marx, 1857–1858

In the framework of the center-left, the platform of the "modern contract" once again revealed a boss certain of his ability to quickly retake full political control; it demanded the "collaboration" of workers with a massive and rationalized rise in productivity through a further socialization of work: "automation," "pluralistic programming," "State reform"; the **working class** recomposed as the Social Brain of capitalist production, imprisoned in an even higher level of dead labor, of machines, which manage the **working class** with greater rationality yet set themselves against those workers and squash them through the political domination of **capital**[in the form of fixed **capital**].

—Romano Alquati, 1964

We should understand the **society of Control**, in contrast, as that society (which develops at the far edge of modernity and opens toward the postmodern) in which mechanisms of command become ever more "democratic," ever more immanent to the social field, distributed throughout the brains and bodies of the citizens. The behaviors of social integration and exclusion proper to rule are thus increasingly interiorized within the subjects themselves. Power is now exercised through machines that directly organize the brains (in communication systems, information networks, etc.) and bodies (in welfare systems, monitored activities, etc.) toward a state of autonomous **alienation** from the sense of life and the desire for **creativity**.

—Michael Hardt, Antonio Negri, 2000

Noopolitics is "the ensemble of techniques of control that is exercised on the brain. It involves above all attention, and is aimed at the control of **memory** and its virtual power.

—Maurizio Lazzarato, 2006

Panic happens when the speed and **complexity** of the surrounding flow of information exceed the ability of the social brain to decode and predict. In this case desire withdraws its investments, and this withdrawal gives way to depression.

—Franco Berardi, 2009

As the above quotes reveal, the brain's relationship to **Workerism** and **Post-Workerism** is complicated and profound. The definition of the brain proposed here is based upon a coextensive extended and embodied model. It connotes both its intracranial matter consisting of neurons, cognits, and neural networks and an extra-cranial milieu composed of objects, things, relationships, and social, technological, and **cultural** relations in transition that form and coevolve with its intracranial counterpart. This is what is what is referred to as the brain's broad rather than limited definition. This intracranial extra-cranial complex is shaped in time and space by competing and uneven, ideological and discursive fields of unequal and shifting capacities. Important in this respect is the concept of the **nature**-culture continuum at the heart of what Rosi Braidotti calls, in her book *The Posthuman*, a radical **posthumanism**. "The idea of '**nature**-cultures' brings to an end the categorical distinction between life as bios, the prerogative of humans, as distinct from zoe . . . What comes to the fore instead is new fractures within the human, new human-non-human linkages, new 'zoontologies' as well as complex media-technological interfaces." A humanism without Eurocentrism that displaces its unitary subject and replaces it with a complex, global, non-binary relational one.

Workerism evolved into **Post-Workerism** during a moment of profound crisis, when a variety of economic, social, and political relations combined with media-technological interfaces to create innovative forms of **accumulation** and positive and negative **externalities**, which together placed new pressures upon dead and living labor. A new form of nonlinear, distributed **machinic intelligence** began to predominate and reconfigured the place of the worker from the assembly line to one in front of a computer screen with access to a universe of knowledge at his or her fingertips. The genius of this loose cohort of writers, political philosophers, and futurologists, that were the fathers and mothers of this political-philosophical enterprise, was to realize, with profound insight, the implications of these changes. The shift of the phenomenological landscape that emerged required

an active rather than passive perceptual account in which affordances supersede *gestalts*. Performativity and **immaterial labor** became the predominant forms of labor in what would become known as **early cognitive capitalism**. Emotions, affects, feelings once outside the scope and concern of capitalism formed its central core. Altogether these influences became essential to subject and subjectivity building.

I would like to suggest that we are now at the threshold of another transformation and crisis of labor and the laborer, the so-called late stage **cognitive capitalism** or **late cognitive capitalism**. Although the term "neural turn in **cognitive capitalism**" might be a more appropriate way to name this late stage phase of **cognitive capitalism**, I still prefer to use the label "the cognitive turn in cognitive capitalism" because of its link to the word "cognitive," which has its root in the word "cognition" and which infers a contested, extended, and embodied brain as well as being semantically continuous with the practices of cognitive neuroscience which focuses upon the material substrates of emerging mental processing. It is my belief that the well-meaning cognitive neuroscience community, as a result of its relationship to military and corporate funding schemes like DARPA and **Facebook**, are unwittingly facilitating the dystopian futures of neoliberal **cognitive capitalism** and **neural capitalism**. Just as the transition to the knowledge and **information economy** precipitated new forms of resistance, the impending neural economy also requires a response. This glossary, which reformulates many of the ideas and theories found in **Post-Workerism**, is a beginning of doing just that. It means to accompany the three-volume publication *The **Psychopathologies of Cognitive Capitalism*** Part 1, 2, and 3. It reflects upon their concerns and marks the beginning of a long-term process of creating a dictionary with which to understand and, eventually, destabilize the complex ways through which a future **Neural Capitalism** will work in creating contemporary forms of governance and **neural subsumption**. **Neural subsumption** designates the new imminent form of subsumption that is an inflation of the term **real subsumption** in which the entirety of

life itself becomes work. **Neural subsumption** constitutes a future condition brought about by an assemblage of networked **neural technologies**, such as the wired brain like **Brain-Computer-Interfaces** as well as cortical implants and **neural dust**-smart dust complexes. No thought, conscious or unconscious, will be left unrecorded, encoded, or surveyed. This brain wave surveillance will expand what Shoshana Zuboff has characterized as the **Big Other** for the present ubiquitous networked institutional regime, which through statistical analysis of captured data creates new opportunities for monetization and profit (Zuboff, 2015). It is already possible for brain waves generated by a living brain to be translated into code and processed by a computer to help paralyzed individuals feed themselves and ambulate by a wheelchair. Suppose brain waves used in such a way can be used to manipulate a cursor on a computer screen in order to direct a robotic arm or move a wheelchair. In that case, it is not such a radical jump to consider the possibility of the opposite happening. **Machinic intelligence** may soon generate patterns of electrical potential that can move in the opposite direction entering the intracranial brain from an external position to modulate its interior local and global neural activity directly. This represents the true singularity not so much as **machinic intelligence** will outperform human intelligence, as is commonly thought, but rather human intelligence seamlessly captured and directed by an external intelligence will be unwittingly controlled by this digital dominion. I am wagering that instead, new telepathic systems, also known collectively as the wired brain, will create an alternative post-phenomenological disposition. Instead of the perceptual and cognitive systems of the nervous system interacting with the sensible directly, a synthetic array of neural connections, referred to as the synthetic **connectome**, will instead orchestrate a simulated score the brain reacts to and performs. This is how Slavoj Žižek describes the wired brain in his book *Hegel in a Wired Brain*, "'Wired brain' refers to a direct link between our mental processes and a digital machine, a link which, while it enables me to directly trigger events in reality with a mere thought . . . it also enables the digital machine to control my thoughts" (Zizek, 2020). Another

root cause of this endeavor began with studying Gilles Deleuze's cinema books and the book he coauthored with Felix Guattari, *What is Philosophy*. They created the foundation upon which I began to understand how my background in art, architecture, neuroscience, and medicine might be entangled with issues of cinema studies and **political economy** to form an intersectional practice. Indeed, art, like cinema, could create new connections in the world and in the brain too, and **neural plasticity** provides its **agency**. In his essay "Three Neuroaesthetics," Charles Wolfe describes this as the idealist position of neuroaesthetics, which, as he explains, has radical political implications (Wolfe, 2016). Echoing the words of Catherine Malabou, it suggests that if we have the will, we might be able to use our neuroplastic **agency** in political ways that might impede the immanent nightmare I have described above by creating emancipating environments which might instead produce more facile and complex brains with greater degrees of freedom (Malabou 2008). In her book *The Brain's Body*, Victoria Pitts-Taylor comes to a similar conclusion and states: "The social brain, in sum, is equated with mind and self, is understood as the product of embodied experience, is seen to provide the foundation for (and is reflected in) social structures, and is subject to intervention and transformation... Although it is not framed as such in scientific accounts, the plastic, social brain also reveals neurobiology to be political, that is, capable of change and transformation, and open to social structures and their contestation." As a result, a brain that could, in fact, resist, what I call the **neurocene**, or that brain sculpted by the tautology of circulating semantic, sociologic, scientific, and philosophical tools and codes of twenty-first century capitalism in which **nature** and culture are separate and at odds. One, for instance, that prevents us from contemplating the environmental disaster that awaits our earth and its inhabitants.

Warren Neidich, Berlin, 2019

ACCELERATIONISM Most **people** give credit for coining the term "**Accelerationism**" to Benjamin Noys in his essay *The Persistence of the Negative* (Noys 2010), but as he admits himself he first came across the term in Roger Zelazny's sci-fi novel, *Lord of Light* (1967). In his "Futures of **Accelerationism**" (Noys 2016), Noys states that he is the first to use it as a critical term to refer to a particular philosophical and political concept. Although he notes that the root of this accelerationist moment could be found in a field of thought generated in the early 1970s by Jean-Francois Lyotard, Gilles Deleuze, Felix Guattari and Jean Baudrillard, it is Deleuze and Guattari's usage in their *Anti-Oedipus* that is most relevant for us here. Instead of holding back or withdrawing from capitalism, they suggest an opposite response: to release capitalism from its inherent constraints maintained by assemblages of feedback loops and instead substitute a feed forward dynamic. "To go further still, that is in the movement of the market of decoding and deterritorialization? For perhaps the flows are not yet deterritorialized enough, not decoded enough, from the viewpoint of a theory and practice of a highly schizophrenic character. Not to withdraw from the process, but to go further, to 'accelerate the process,' as Nietzsche put it: in this matter, the truth is that we haven't seen anything yet" (Deleuze and Guattari 1972/1983).

This becomes the originating statement for two stem concepts that characterize **Accelerationism**; a right-leaning **Accelerationism** proposed by Nick Land and its counter-supposition, a left-leaning **Accelerationism** suggested by Mark Fisher. Here is Land rephrasing Deleuze in his chapter "Machinic Desire" in *Fanged Noumena* (Land 2011): "Machinic revolution must therefore go in the opposite direction to socialistic regulation; pressing towards ever more uninhibited marketization of the processes that are tearing down the social field, "still further" with "the movement

of the market, of decoding and deterritorialization" and "one can never go far enough in the direction of deterritorialization: you haven't seen anything yet."

The right-leaning **Accelerationism** leads to neoreactionism or the NRx movement, which forms the philosophical underpinnings of the **Alt-right** in which CEO monarchists are running micronations. Furthermore, according to Land in his chapter "Circuitries" in *Fanged Noumena* (Land 2011), right-leaning acceleration leads to a moment when "artificial intelligences surpass the horizon of biological ones..." and "The high road to thinking no longer passes through a deepening of human cognition, but rather through a becoming inhuman of cognition, a migration of cognition out into the emerging planetary technosentience reservoir, into "dehumanized landscapes..." (Land 2011). Fisher's response in *Terminator vs. Avatar: Notes on* ***Accelerationism*** (Fisher 2010) is one of outrage: "Land's piratings of *Terminator*, *Blade Runner* and the *Predator* films made his texts part of a convergent tendency—an accelerationist cyber-culture in which digital sonic production disclosed an inhuman future that was to be relished rather than abominated." Both left and right leaning accelerations calls for the collapse of capitalism resulting from a thrombosis in an over taxed circulatory system run amok.

The left-leaning **accelerationism**, in opposition to the right-leaning one, calls for much of the same things as **postcapitalism**. The advanced info-technologic revolution leads to a sharing, peer production and a collaborative economy which has more in common with communism than capitalism. According to Nick Srnicek and Alex Williams, two of Land's students, in their "#Accelerate: Manifesto for Accelerationist Politics" (Srnicek and Williams 2013), capitalism doesn't need to be destroyed but repurposed towards socialist ends. They too want to accelerate technological evolution and release it from the bondage of capitalist rules and regulations but with very different results. While much of the current global platform is biased towards capitalist social relations, this is not an inevitable necessity.

Instead they call for a repurposing of neoliberal capitalism in order to emancipate its latent potentialities from technoscience and its capitalist objectives; **intensive** multiplex desiring machines. They suggest that we must recover the dream of a future to push the wonders of technology forward—in spite of the prospect of negative outcomes—to their ultimate and natural conclusions, beyond the repressive, unjust systems of capitalism.

They speculate that a post-Capitalist habitus that neoliberalism is unable to generate will result.

ACCUMULATION **Accumulation** historically was divided into three categories in Marxist thought: capitalist **accumulation**, primitive **accumulation**—or original **accumulation**—and unjust enrichment. As the name implies, **capital** accumulates, or increases, as a result of investment by a company or individual in order to produce positive returns. This can form the **capital** base, or base level, of funding that can grow or be reinvested.

Primitive **accumulation** can be defined in two ways depending on how one interprets history. Unlike Adam Smith's peaceable account of primitive **accumulation**, Karl Marx described original **accumulation** as unjust enrichment. According to Marx, the birth of **capital** was a violent, brutal and appropriative series of events in which landlords granted themselves enclosures of public lands that forced the workers of it to become vagabonds. As Marx writes in the chapter of *Das Kapital* (1867) entitled "The Secret of Primitive **Accumulation**"

> ...these new freedmen became sellers of themselves only after they had been robbed of all their own means of production, and of all the

> guarantees of existence afforded by the old feudal arrangements. And the history of this, their expropriation, is written in the annals of mankind in letters of blood and fire.

Another form of **accumulation** especially important in **cognitive capitalism** is called "**cultural accumulation**." It is specific to the ways and means that knowledge accumulates and fosters collective learning.

Cultural accumulation is a complicated process dependent upon **cultural** processes begetting other **cultural** processes in which past and future **cultural** inventions are linked (and sometimes dependent upon each other). Some theorists interested in the possible relations between **cultural evolution** and biological evolution have described an effect known as the "**Baldwin effect**," named after an early 20th-century psychologist, James Mark Baldwin. This was meant to address the possibility that traits, which are not strictly biological could also be transmitted, via learning and other **cultural** practices acting upon a polymorphous assortment of individual **variations** in the **gene** pool. Implicit individual genetic **variations** not relevant in one sociological context could give selective advantage in another and if that sociological context is stable over generations could act on the conspecific **gene** pool to skew it in favor of that particular genetic **variation** which first becomes fixed as an acquired trait and then inheritable.

According to the cognitive turn theory, **cultural accumulation** can have material effects upon the brain in the form of **memory** and the production of new neural circuitry as a result of the sculpting of its **neural plasticity**. According to Stanislas Dehaene and Laurent Cohen in their article "**Cultural** Recycling of Cortical Maps" (Dehaene and Cohen 2007), through what he calls neuronal recycling, "**cultural** inventions", like

reading and writing, "invade evolutionarily older brain circuits." I argue in my essay "Epilogue: Telepathic Exaptation in **Late Cognitive Capitalism**" (Neidich, 2020) that the same might become true for telepathy. I speculate that dedicated modules for telepathy might evolve as a result of the acceleration of telemetric and telepathic devices flooding the market, like brain-computer interfaces, cortical implants and neural lace linked to the **Internet of Things** and the World Wide Web, which will be required for us to live and work effectively in the future. At first machinic and technological, their eventual **accumulation** will induce neural accommodations in the form of special modules for telepathy colonizing related neural material and neural predispositions.

ACTIVIST NEUROAESTHETICS In our moment of **Cognitive Capitalism** in which the brain and mind are the new factories of the twentieth century, three different descriptive models of **Neuroaesthetics** have emerged: the positivist, idealist, and activist. POSITIVIST NEUROAESTHETICS attempts to explain the aesthetic field and its production (artworks) by referring to neuroanatomical models aided by technology (i.e. neuroimaging). POSITIVIST NEUROAESTHETICS' goal is to explain artworks, such as paintings, through its effects upon the brain's neural processing rather than as something happening independently, or outside of the material brain's jurisdiction (for example, in relation to events and processes happening in the world of art). **ACTIVIST NEUROAESTHETICS** includes what is missing in this account namely the intentions of the artist as a provocateur or the social, political, economic, or **cultural** becomings that provide the context of the work's production, for instance, Russian Constructivism and Agitprop. The context of a particular artwork embedded in a history of ideas, techniques and materials to which it responds is essential to this position. **ACTIVIST**

NEUROAESTHETICS is comfortable with art works that are conceptual, contingent, stochastic and immaterial. It creates artistic facts rather than scientific ones which produce multiple alternative paradigms that exist independently and synchronously. Artworks do not require direct peer review, are not subject to statistical analysis and a single artwork like Marcel Duchamp's, *R. Mutt*, 1917, or Niki de Saint Phalle's gunshot paintings such as *Shooting Picture*, 1961, can alter the history of art. Unlike POSTIVIST NEUROAESTHETICS it embraces the importance of **emergence** and broadcasts the magic of art and its phantom potential. Today POSITIVIST NEUROAESTHETICS colludes with neoliberal **cognitive capitalism** in order to produce a perfected **cognitariat** working on the WWW and various virtual platforms. **ACTIVIST NEUROAESTHETICS** *actively* engages with the **cultural** milieu and its **cultural memory** to instigate changes in the brain's materiality: its white and grey matter. **Neural plasticity** and epigenesis are key to this process and are related to Bernard Stiegler's concept of **epiphylogenesis**. As Victoria Pitts-Taylor has written in the introduction to her book *The Brain's Body: Neuroscience and Corporeal Politics* (2016), "Although it is not framed as such in scientific accounts, the plastic, social brain also reveals neurobiology to be political —that is, capable of change and transformation and open to social structures and their contestation."

Additionally, unlike its positivist counterpart, **ACTIVIST NEUROAESTHETICS** is not linked to a criterion of functionality because its underlying purpose is to explore (dis)functional solutions to disclose and reveal new paradigmatic landscapes of alterity. In this way, **ACTIVIST NEUROAESTHETICS** entangles the brain's **variation** at birth—its **dendrites** and axons with different tuning capacities—with ever-expanding **cultural variation** in space and time with which it is linked. The focus of

A

ACTIVIST NEUROAESTHETICS, therefore, is this neural **variation** and emphasizes that the political power of art and culture is to promote the neural diversity that results.

AFFECT

In his book, *Parables of the Virtual: Movement, **Affect**, Sensation,* (2002), Brian Massumi, following Baruch Spinoza in his *Ethics* (1677), defines **affect** as a third state hovering between activity and passivity of bodily experience, being influenced or "affected." According to Massumi, in late capitalism any approach to the image limited to the semantic or semiotic level of language use is inadequate and must be supplemented in order to express the event. It is **affect** as intensity that enhances our information and image based culture.

Borrowing from Deleuze and Simondon, Massumi develops a theory of **affect** that is differentiated from theory of emotion. As **affect** is unqualified, emotion is qualified. Emotion is the most intense expression of the capture of **affect**. Its intensity is owned and recognized through a concretized narrative, the result of a concatenation of possibilities, which become realized as a single unity expressed through language. **Affect**, on the other hand, is a pluripotential condition of a pre-individual state which engages multiple possibilities of logic and temporality simultaneously. As Massumi posits they are "locked in resonance with each other and recapitulate the event in different ways." In response, the body is swayed; its power of acting increased or decreased. It promotes a passing of a threshold, which leads to a feeling of change and a redefinition of capacity, describing a body unfixed, in a constant state of becoming. For Massumi, the affective turn is an opening up of the body to an understanding and realization superior to conscious: semantically-constructed perception. Through its indeterminacy, it produces a body beyond biomediatic registration and subjugation comparable to Artaud's and later

Deleuze and Guattari's concept of the **Body without Organs (BWO)**. The affective body is not constituted by linear arrangements of temporality, but, rather, by non-distinct forms of non-linear expression in transition distributed and emergent, operating at sites far beyond equilibrium. The developing embryo and its regions of indeterminacy are useful here as a metaphor. **Emergence**, like the seething and fluid regions of the single layered blastula transitioning itself into the multilayered gastrula in the process of embryogenesis, cannot be understood as a matter strictly of forms, but, rather, of fields of differentiation such as endoderm, mesoderm, and ectoderm, separated from each other by dynamic thresholds rather than boundaries that help determine somatic effects. Like the relation of emotions to **affect**, emotions represent the limits of the field of **emergence**, as, there, expression casts a shadow on the potential of the field.

Michael Hardt and Antonio Negri in their book ***Empire*** (2000) take a slightly different perspective in describing **affect** in its economic and political dimensions. They describe the essential role **affect** plays in **immaterial labor**. **Immaterial labor** does not leave a trace and produces such intangibilities as feelings of ease, well-being, and passion, and constitutes one of the essential characteristics of labor in **cognitive capitalism**. Importantly, **immaterial labor** has now been commodified, for instance in the entertainment industry where it is focused upon and manipulated, as well as in social media, e.g. **Facebook**, where it is digitalized. **Affect** is also a central component of **affective labor**, or what feminists such as Silvia Federici refer to as "woman's work," or labor in the bodily mode. In her influential pamphlet, *Wages Against Housework* (1975) she states,

"They say it's love. We say it's unwaged work." Along with other feminists who had convened in Padova, Italy in 1972 she rejected the separation between unpaid work in the home and paid labor in the factory. Implicit in this demand was a certain ambivalence arising from the question of whether this demand was a call for compensation for unpaid labor or a means with which capitalism might recuperate this labor into its system. Later on the question of **affective labor** would be folded into a much broader analysis of social reproduction in which cooking, cleaning, raising children was linked to expectations of feminized care, emotional support, warmth and comfort, and sex. Indirectly they made possible men's waged work in the factory.

AFFECTIVE LABOR **Affective labor** joins together the ideas of Karl Marx and Sigmund Freud, combining them with a more nuanced feminist reading to identify the category of "women's work." This includes "kin work" and "caring labor," and is sometimes also called "desiring production." According to Michael Hardt in his essay "**Affective Labor**" (Hardt 1999), **affective labor** is an important subcategory of **immaterial labor** and is used to express how labor—as reproduction—produces collective subjectivities, sociality, and, ultimately, society itself. In **cognitive capitalism**, **affective labor** has ascended in importance, resting at the pinnacle of the hierarchy of labor forms. In the tertiary informational and service economies, it has managed this without losing its capacity for subversion and resistance. Hardt suggests **affective labor** produces emotions and relationships—feelings of ease, well-being, satisfaction, excitement, and passion. Key to his thesis is the idea that, in the new economy, the distinction between productive labor and unproductive labor—which reproductive labor was once considered—has become blurred.

Affective labor, according to Silvia Federici, in *Revolution at Point Zero: Housework, Reproduction, and Feminist Struggle* (2012), is a component of every

form of work rather than a subcategory of reproduction only. She suggests that a significant deficit in Hardt and Negri's argument in their book ***Empire,*** is that they failed to take into account the revolt of women in the 1960s and 1970s against reproductive labor and its unpaid character. Federici also substitutes the term "reproductive labor" for **affective labor**, asserting that **affective labor**'s immaterial quality describes just a limited part of the work entailed for the reproduction of human beings, which necessitates a complete engagement with those needing care. Feeding, washing, combing hair, and distributing medicine is physical work which cannot be understood simply as immaterial. She also understands this denotation of "women's work" as a necessary component of capitalistic subjugation of women *vis-à-vis* control of reproduction, and, therefore, of **accumulation**. In an interview with George Souvlis entitled "Feminism and Social Reproduction" (2017), she describes how the devaluation of women's work is also necessary for the capitalist class "which otherwise would have had to make a major investment into all the infrastructures necessary to reproduce labor-power and its rate of **accumulation**." This, then, is the basis for the affective economy of romantic love that embraces the **cultural** conditions of marriage and marital relations, leading to the enslavement and exploitation of women.

AFFORDANCE THEORY The American psychologist, James J. Gibson, was first to describe **affordance theory**, in his book, *The Ecological Approach to Visual Perception* (1979). It proposes an interactionist view of perception that focuses on information available in the environment and links this perception of the environment with a future physical action. Humans alter their environment in order to change its affordances to better suit their needs. In the field of user-interface design, affordance

characterizes the fundamental properties of a thing that are self-evident or suggestive, and expresses how it can be used. For instance, a button lures a machine operator to press it in order to start engines, whilst a tea cup handle is meant to be grasped by the index finger in a specific way before one takes a sip. The user knows how to operate an object, as well as what to do, without instructions, labels, or pictures. Recently, affordances have been used to understand how complex semantic situations operate through a system of constraints to which the subject is attuned. As a result, **affordance theory** has been expanded to help explain processes of socialization and **agency**. The conceptual implications of Gibsonian affordances are also considerable (as Andy Clark and others have noticed, Gibson offers something like a more naturalistic way of being quasi-phenomenologists): affordances cut across the subject-object dichotomy because, as Mike Wheeler puts it, they imply the "conceptual complementarity of agent and environment" (Wheeler 2005).

AFROFUTURISM According to McKenzie Wark, in a blog entry on the Verso Publishers website, **Afrofuturism** was a term first put in circulation by Mark Dery but further developed in the art of Sun Ra whose **Afrofuturism** was marked by what Paul Gilroy had earlier called double refusal of a status as situated earthly slave. Power as expressed by a traditional dissimulated or deceitful imperial **archive**, especially as it pertains to the representation of people of color is now, with the advent of new tools of media and the Internet, reversed, affording the opportunity to create new futures of truth. Kodwo Eshun in his essay "Further Considerations on **Afrofuturism**," borrows a term made famous by Mark Fisher, namely SF (science fiction) **capital**, to describe an alliance between cybernetic futurism and the new economy in an attempt to manage and

predict the future. Nowhere is this more evident and relevant than the establishment of an Afropessimism. This, like the management of the past has implications for contemporary African artists who, according to Eshun, use the concept of extraterrestriality as a means of transvaluation rather than escapism and the site for the production of counter-futures. In **cognitive capitalism** this becomes a means of dissembling the preferred future that science fiction presents.

Quoting Eschun, " To conclude: **Afrofuturism** may be characterized as a program for recovering the histories of counter-futures created in a century hostile to Afrodiasporic projection and as a space within which the critical work of manufacturing tools capable of intervention within the current political dispensation may be undertaken" Eshun (2003).

AGENCY **Agency** is the power to think and act for oneself, or for a collective interest. It is dialectically related to structure, which, in sociological terms, describes the complex set of interconnected social forces, relationships, and institutions that together act against it to subsume individuality, collective thought, behavior, and experience. Society is in a state of becoming and is shaped by the individuals and collectives who live within it. Individuals and collectives of actors may decide to reaffirm the contingencies of the social environment and *status quo* to reproduce norms, or they may choose to resist and challenge social order, and, thereby, reshape it. As much as **agency** in the sense of action is an object of technical philosophical debates (partly replacing the older ideas of free will), it is nevertheless centrally a political term. That is, **agency** first became an important word in the context of civil rights, minority and identity politics movements, where it chiefly reflected the goal of giving groups who had not been allowed a voice or a decision-making capacity... **agency**. In the late stages of **cognitive capitalism**, **agency** describes the degree to which individual and collective actors have the ability to shape and sculpt their own neuroplastic potential through changing and restructuring their sociological contexts and designed environment(s). Reshaping the brain's **neural plasticity**, therefore, is a form of disobedience and is a key component of **Activist Neuroaesthetics**.

ALGORITHM(S) Taking its name from a Latinization of the name of the 9th century Persian mathematician Al-Khwarizmi, an **algorithm** is an unambiguous specification for the resolution of a class of mathematical problems. Ed Finn, in his book, *What **Algorithms** Want, Imagination in the Age of Computing* (2017), describes the history of computing **algorithms** beginning as a recipe, set of instructions, or sequential arrangement of tasks, invented to achieve a particular calculation or result. Later on, they became understood pragmatically, as any set of mathematical instructions used to manipulate data or reasoning. Embedded in these automated systems are human bias and values reflecting the engineers who originally designed them. Following N. Katherine Hayles' idea of "effective computability," and her so-called "Regime of Computation," Finn describes the **algorithm** as an ontological structure for understanding the universe and echoes John. Holland's idea of "genetic **algorithms**" (Holland 1992). It thereby transitions to embody reality in culturally readable ways. This algorithmically understood and produced social and technical reality becomes coupled to the developing brain. Quoting Andy Clark in his *Natural-Born **Cyborgs*** (2004), Finn highlights the looping interactions between "material brains, material bodies, and complex **cultural** and technological environments." Of particular importance is the recent use of **algorithms** in **consumer neuroscience** and **neuroeconomics**. In a recent article entitled

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"Advancing **Consumer Neuroscience**" (2014) by Ale Smidts et al., the researchers elaborate the ways and means that computational methods are being used to relate types of behavior and brain responses. For instance, they are especially interested in the ways that **algorithms** are being used to evaluate massive amounts of multivariate data to neuroimaging data in prognosticating future subject behavior. They state the following,

> Thus, these neurobehavioral models may eventually inform more specific and nuanced accounts of economic decision making in the context of consumer behavior (e.g., segmentation).

ALIENATION In **cognitive capitalism**, **alienation** is linked to its foundational meanings in Hegelian and Marxian dialectics. According to Georg Wilhelm Friedrich Hegel and Karl Marx, true fulfillment of the self (true actualization) is inhibited by one's contingent relationship to the authority of religion and culture. In the age of industrialization, **alienation** is linked to abstract labor. Unlike the process of producing handmade, crafted objects, the industrial laborer is restricted to a fractionated task on an assembly line where his or her actions are optimized and separated from the full satisfaction of realizing the production of the whole. In our present postindustrial century of the brain— in which the brain and the mind are the new factories of capitalist production, research, and optimization—a neural, material form of **alienation** must be theorized. First, abstract labor and **machinic intelligence** have become fractalized into components beyond the capacity of our bodily perceptions and cognitive capacities to make sense of them: they are sublime. Secondly, **cultural** and technological accelerations have exceeded the capacity of the subject's neural plastic potential to keep pace with these rapid

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changes. **Cultural** plasticity has outdistanced **neural plasticity**. A technological divide has occurred as the brain's capacity to keep pace has lagged, creating a gap in the brain's ability to make sense of the new techno-**cultural** *habitus*. For instance, a generational rupture has occurred between those born before and after 1989—digital "immigrants" and so-called "digital natives." I would argue that beyond simply the skill set required for technological adaptation, this presumed digital divide is a result of a neural material deficit. The ensuing **alienation** is a result of a lack of adequate perceptual and cognitive habits to deal with our new environment. Fredric Jameson in *Postmodernism, or The **Cultural** Logic of Late Capitalism* (1991), building upon the remarkable analysis of Walter Benjamin's essay, "The Work of Art in the Age of Mechanical Reproduction," develops a discursive framework to understand this divide. Benjamin remarked that the 5th century with its great shifts of populations provoked the late Roman Art industry and the Vienna Genesis and there "developed not only an art different than antiquity but also a new kind of perception." Commenting on a similar provocation, that which emerged as a result of Post-Modernism and presented itself in the 1980s, Fredric Jameson, in his book cited above, called for the expansion of the human sensorium and the growth of new organs of perception made necessary by the new spatial/temporal relations created by hyperspace. He argues there in relation to the Westin Bonaventure Hotel, Los Angeles designed by the architect John Portman that visitor/subjects who happen into this space, especially those whose perceptual habits were nurtured by the Euclidean dimensions at the heart of modernism, are physiologically unready to understand the experience that this post-modern space provokes. "There has been a mutation in the object unaccompanied as yet by an equivalent mutation in the subject."

Furthermore,

> We do not yet possess the perceptual equipment to match this new hyperspace, as I will call it, in part because our perceptual habits were formed in that older kind of space I have called the space of high modernism... The newer architecture therefore, like other **cultural** products I have evoked in the preceding remarks, stands as something like an imperative to new organs, to expand our sensorium.

This sensorium is not simply limited to the array sensors that link up the environment or world picture or cinema to the body but the neural material assemblages to which they then communicate and which transmit the information trans-cerebrally. In other words these new organs refer to the plastic neural analogues epigenetically sculpted by **accumulation**s of contemporary perceptual facts realized, for instance, in the changing institutionally rendered attention networks that make up our **intensive** post-modern world.

Jameson, using the model of **cognitive mapping** first discussed in Kevin Lynch's *The Image of the City*, takes his analysis one step further in realizing that this disjunction mentioned above has political import in our new global multinational world delineated by decentered **intensive** communicational and computational networks. He states that "the initial bewilderment of the older modernism-as the velocities of spacecraft to those of the automobile-can itself stand as the symbol and analogon of that even sharper dilemma which is the incapacity of our minds, at least at present, to map the great global multinational and decentered communicational network in which we find ourselves caught as individual subjects."

ALT-COGNITIVE ERGONOMICS **Alt-cognitive ergonomics** describes artistic interventions that deterritorialize cognitive **ergonomics**. In **cognitive capitalism**, the brain's (and mind's) relation to a designed virtual environment, during cognitive laboring, supplants the worker's bodily relations to the planned working environment that defined industrial capitalism.

Like visual **ergonomics**, cognitive **ergonomics** is aimed at the production of a perfectly customized global consumer in an environment designed by neoliberal **cognitive capitalism**. The essential difference is that visual **ergonomics** is active upon those sesnsorial-perceptual systems are in direct contact with the environment. For the sake of this argument the phrase 'visual **ERGONOMICS**' expresses that the visual system is highlighted. However what is true for opticality is also true for the other sensory systems, such as hapticity and aurality, including their peripheral sensory organs and their depots in the thalamus, an intermediate processing center, and their destination in the **cerebral cortex**, like the visual and auditory cortex. Cognitive **ergonomics** operates further up the processing hierarchy in association areas like the temporal and parietal lobes, and in the more rostral areas of the frontal cortex—important for advanced forms of abstract thinking like prediction, **working memory** and attention. This distinction has important implications for the expressions of resistance to visual and cognitive **ergonomics**. In **alt-visual ergonomics**, artists' productions act upon distributions of sensibility, which according to Jacques Rancière, in his book *The Politics of Aesthetics*, effect the way **a people** are formed from a multiplicity and policed (Rancière, 2004). Through their acts, statements, and procedures they delink and redistribute institutionally produced forms of visuality for instance, that describe the designed urban space of the city or their virtual

counterparts. These acts generate effects upon the visual **cultural** milieu especially during critical periods of development, in the newborn and particularly in adolescence, helping shape the architecture of the intracranial brain constituted by living **synapses** and cognitis. Neural material changes are activated by these new distributions energizing the neural plastic potential of the brain. It is noteworthy that the two systems coevolve through time as a result of processes similar to **material engagement theory** as espoused by Lambors Malefouris, and **epiphylogenesis** as discussed by Bernard Stiegler (Malefouris, 2013)(Stiegler, 2008). Distributions and redistributions of the sensible also include those affective and emotive systems that constitute empathy.

Alt-cognitive ergonomics entails a complex assemblage of mechanisms, which subvert cognitive **ergonomics** and the political rationality to which it is linked. Models of redistributions of sensibility are again called upon to subvert institutional political rationality, but these models utilize different mechanisms. In cognitive **ergonomics**, distributions of sensibility become entangled with distributions of salience emitted by the prefrontal cortex, and the regulation of what incoming sensory data is deemed important. What is deemed important is culturally and ideologically biased. According to Andreas K. Engel et al. in their article, “Dynamic Predictions: Oscillations and Synchrony in Top-Down Processing” (2001), perception is a highly constructed and active process in which top-down inputs regulate it. These top-down influences modulate what are referred to as thalamo-cortical inputs. They are characterized by learned expectations and predictions derived from experience, attention, and **working memory**. According to this “dynamicist view,” synchronous discharges between near and distant neural networks are necessary for

binding, and are, thus, an important component of culturally inflected object recognition, response selection and attention. Accordingly, neural discharges originating from the **cerebral cortex**, especially from the prefrontal cortex, that synchronize their resonances with those of the thalamus, where incoming sensory data is processed, influence perception by enhancing some perceptions and suppressing others. This enhancement can lead to short and long-term memories that later can participate in **working memory** and **the mind’s eye** in envisioning and creating scenario visualizations important for future planning. In **cognitive capitalism working memory** and **the mind’s eye** are the new sight for the display and performance of sovereign power.

With these models at hand might we begin to understand the power of radical **cultural** models in influencing both bottom-up and top-down models of perception and cognition. Uncompromising artistic revelations and reactions provoked by **Workerism**, **Post-Workerism**, Feminism, post-colonialism, and decolonization which become realized and come to inhabit the **cultural** habitus have the possibility to mutate distributions of sensibility with consequences for initial sensorial and perceptual modeling in designated sensorial organs and upstream primary cortices, so-called **bottom-up processing**. They also affect top-down processing through the abstract concepts they conjure and the resultant fields of **saliency** they induce. **Saliency** is a form of internal attention that puts a spotlight on those incoming inputs accentuating those considered important and essential. Culturally and ideologically induced assemblages of abstract knowledge that form our understanding, for instance those coded for and residing in the prefrontal and frontal cortices of the brain where **working memory** is predominately active, are modulated by

discursive practices that delineate our social, **cultural** and political fields and which help form extended mental networks. In other words, artistic and governmental practices effect salience mechanisms through the generation of synchronized top-down resonances originating in the frontal and prefrontal cortex upon incoming bottom-up sensorial data, for instance, accentuating and intensifying certain inputs and diminishing others. They in fact mirror and compete with each other in bottom-up and top-down systems. Institutional regimes thus have two sites of policing in our world of **cognitive capitalism**: 1. Distributions of Sensibility 2. Distributions of Salience. See also (reference needed)

ALT-RIGHT The **alt-right** is a primarily male, right wing movement operating mainly through online chat rooms, bulletin boards, and websites like Breitbart News Network. The movement is openly far-right, sexist, racist, homophobic, and xenophobic. It is driven by the production and dissemination of **fake news** stories that compete with real news, especially on online newsfeeds. The reporter Dexter Thomas, has succinctly characterized the **alt-right** as "racists with a marketing strategy." (cit. in Gourarie 2016). It can be thought of as a pernicious aspect of the **infotainment** industry. Recently, inspired by the words of Donald Trump as they were broadcasted and amplified by social media, many of these groups participated in the January 6th 2021 insurrection and storming of the Capitol in Washington D.C.

ALT-VISUAL ERGONOMICS **Alt-visual ergonomics** describes artistic interventions that deterritorialize visual **ergonomics**. Visual **ergonomics** denotes the process through which real and virtual consumer environments are engineered according to physiological

and psychological attributes of vision, as well as the other senses, such as the limits of the visible spectrum, habits of scanning, and right-left preferences to capture attention and optimize perception. These traits are invariably entangled with culturally and ideologically derived preferences. Visual **ergonomics** is also tethered to things in the designed urban space, e.g. public memorials, and distributions and regimes of visuality. The arsenal of **alt-visual ergonomics** uses uncommon artistic methods of production, such as **collage**, **estrangement**, distortion, and ***détournement***, to create alternative practices of heterodoxy that destabilize and estrange habits of sensorial processing, perception, and action. For instance, they can distort **gestalt** principles such as similarity, closure, continuation, and proximity, or shift attention from the center of a scene to the periphery and distort or make things blurry. They also engage with affordances that call out to the body and mind's motor functions. Other sensory modalities, such as the auditory and kinesthetic, must also be considered in conjunction with visual **ergonomics**.

Together these **gestalts** and affordances constitute assemblages and distributions of sensibility. **Psychedelic drugs** –like **AYAHUASCA**–are another way of producing **alt-visual ergonomics** by provoking defamiliarization and the refunctioning of perceived sensory environments through inducing altered states of consciousness. **Alt-visual ergonomics** is a process active inside and outside the brain. Real consumer environments instantiated in the built urban space as well as in the Internet through the use of repetition, synchronization of **gestalts** and emphasis have the capacity to stabilize and make more efficient labile **synapses** and the networks they participate in. The power of art and architecture resides in their potential to produce alternative sensory fields that effectively

compete with consumer environments. The key to understanding alt-visual ergonoimics is the potential role it plays both inside and outside the skull and most importantly in the role it plays in sculpting the **connectome** –that amalgamation of neural connections that make up the brain.

ANARCHY The word **anarchy**, i.e. absence of rule, also means absence of principle in ancient Greek (*arché* is also principle). To live without principles would be to live without foundationalism.

Anarchy etymologically signifies a policy of resistance to governmental authority in the hope of denying the possibility of the state. Many anarchists would, likely, reject the act of creating such a definition; as such a definition represents a form of imposed regulation, constraint, and **governmentality**. The term has a long history, but in its modern usage, it is frequently associated with the thought of William Godwin and the first modern, self-declared anarchist writer, Pierre-Joseph Proudhon. As the noted Lithuanian anarchist, Emma Goldman, states, anarchism is a "philosophy of a new social order based on liberty unrestricted by man-made law; the theory that all forms of government rest on violence, and are therefore wrong and harmful." Furthermore, **anarchy** stands for the liberation of the mind. Finally, some anarchists see the abominable characteristics of the human animal, like avarice and brutality, not as innate human qualities, but, rather, as a result of coercion and frustration engendered by artificial man-made laws. The eradication of coercion and violence is achieved, in many strains of anarchist thought, not by increasing the number of laws or insisting upon their implementation, but, rather, in nurturing the latent forces of solidarity and sympathetic understanding resting in all of us.

ANTHROPOCENE The term **Anthropocene** was introduced by Paul Crutzen to emphasize the important role of humankind in the transformation of geology and ecology. According to him and his collaborator Will Steffen in their article "The **Anthropocene**: Are Humans Now Overwhelming the Great Forces of **Nature**" (Steffen et al. 2007) the causes of this alteration are human driven and consist of changes in *i*) the biological fabric of the Earth; *ii*) the stocks and flows of major elements in the planetary machinery such as nitrogen, carbon, phosphorus, and silicon; and *iii*) the energy balance at the Earth's surface." Furthermore, according to them the results of these interventions will be a planet that is biologically less diverse, less forested, much warmer and tempestuous. The period of the Holocene, which preceded the **Anthropocene**, is characterized by powerful but less dramatic ecological events that were for the most part local and transitory. For instance, the invention of fire is said to have led to early megafauna extinctions and may have prevented a second ice age.

They suggest that it was the adaptation of the coal driven steam engine, invented by James Watt, to industrial production, in the 1770s and 80s, that ushered in the industrial age and the **Anthropocene** Stage 1. No indication is better correlated to the destruction of the biosphere and atmosphere then the **accumulation** of CO_2 directly correlated to the consummation of fossil fuels. By their account the industrial era spans the years from 1800 to 1945 and is followed by The Great Acceleration (1945-ca. 2015) or Stage 2 of the **Anthropocene**. During this later period the population doubled, the global economy increased 15-fold, petroleum consumption increased by a factor of 3.5 and the number of automobiles expanded from 40 to 700 million. The effect on the ecosystem of this expansion of the human industrial habitat has been dramatic, leading to the imminent sixth extinction in human

history as well as a precipitous rise in CO_2 concentration in the atmosphere from about 310 to 380 ppm since 1950; about half of the total rise (48 ppm) occurring in just the last 30 years. (Steffen et al. 2007) Current CO_2 levels have reached 418ppm as of March 27, 2021. Of interest for the concept of the **anthropocene** is the way Bruno Latour and Isabelle Stengers confront it with the idea of the Parliament of Things in which human and non-human creations are equally represented and technologies are seen not as tools of control but of understanding and negotiation. Here is how Stengers puts it in her book *Cosmopolitics II*: the Parliament of Things, "would also be modern, would embrace only 'modern' representatives of conflicting interests. Such representatives must be capable of 'promoting' the constraints that, according to them, an innovative device, disposition, or product must satisfy based on commonly intelligible criteria alone"(Stengers 2011). In their cosmology the distinction between subject and object is abolished in favor of what are thought of as quasi-objects. This opens up a new kind of politics called a cosmopolitics. Massimiliano Simons in his article, "The Parliament of Things and the **Anthropocene**: How to Listen to 'Quasi-Objects'" (2017), the imminent disaster that the **anthropocene** implies cannot be limited to a politics of subjects and, according to Latour, requires an object-oriented democracy or a "Dingpolitik", if a solution is to be arrived at. "Ding" politics takes into consideration concerns related to affected objects and makes power lateral rather than hierarchical. This is where a Parliament of Things becomes essential.

APPARATUS In *Power/Knowledge: Selected Interviews and Other Writings 1972–1977*, Michel Foucault defines a *dispositif*, or **apparatus**, as a set of heterogeneous elements that form a network of discourses, institutions, administrative measures, scientific statements, and philosophical, moral, and philanthropic positions. An **apparatus** is a strategic concatenation that functions at a specific historical moment of urgency. It works as a rational and concrete intervention at the intersection of power relations, which it can either develop or stabilize. Giorgio Agamben, writing after Foucault, further unpacks the etymology of this term in his book, *What is an **Apparatus**? and Other Essays* (2006). The concept ultimately derives from the German *Das Gestell,* which means something that gathers together or frames, and the Greek *oikonomia*, which refers both to the administration of the home and to a set of practices, bodies of knowledge, and institutions that govern human emotion, behavior, gesture, and thought for a common good; hence, our understanding of apparatuses as machines of governance that produce subjectification.

In the 1970s the notion of the **apparatus** was expanded to the field of cinema studies, especially in the writing of Laura Mulvey, Christian Metz, and Jean-Louis Baudry. They understood **apparatus**' functionality in film in both of the following ways: as an industrial machine that produces a virtual, seamless reality experienced by a passive viewer, and as a mental or psychic system which, through Freudian and Lacanian psychoanalytic theory, entangles itself with the fundamental structures of the developing, desiring, imaginary subject. Their work moved towards the reinvention of this definition in terms of cinematic apparatuses, which, together, created the seamless reality of the filmic experience that *Nouvelle Vague* filmmakers (Jean-Luc Godard and François Truffaut, Agnès Varda amongst others) attempted to produce. Through their explicit disruption of the apparently seamless, fictive continuity that cinematic screens historically present to passive audiences—whose consciousness is sutured to the filmic substance—these cinematographers

manifested modes of resistance to the dominant institutional ideological regimes. In my own 2003 book, *Blow-up: Photography, Cinema and the Brain*, I extended this idea of the cinematic **apparatus** to include its internalized counterparts operating in the brain and mind, which the imagination and mind's eye use to construct scenario visualizations and narratives. In **cognitive capitalism**, **the mind's eye** is the screen upon which power projects its will and the stage upon which internal consciousness is performed. In a process analogous to Bernard Stiegler's idea of externalization, apparatuses of cinema, especially its temporal component, and, now, in its full virtuality, are imported to inside the skull where they inhabit and occupy temporally-engaged neural apparatuses, such as **binding** and **reentry**, mutating the inherent rhythmicity of the mind which is important for thought. This process is either temporary, or, if intense and repetitive enough, enduring and permanent leave traces in the material brain. Also important here is Stiegler's concept of cinematic time and cinematic consciousness elaborated in *Technics and Time 3, Cinematic Time and the Questions of Malaise* (2011). Stiegler's theories act as windows through which we might view one thesis of this glossary: that there is a mirroring and co-evolutionary entanglement between the extracranial brain composed of technological inventions, social concatenations, political economic interventions, and the situated intracranial brain.

APOPTOSIS **Apoptosis** is a general term that refers to a process of programmed cell death. It occurs in many cell systems in order to regulate normal cell turnover, proper functioning of the immune system, and embryonic development. In the nervous system, **apoptosis** is part of a process of epigenetic pruning and regression of **neurons** and **dendrites** that fail to establish functional

connections. It follows a genetically-programmed period of exuberant growth of **neurons** and **dendrites** in neonates called the "critical period," and is essential for the proper development of the brain. **Apoptosis** is a key component of the Theory of Neuronal Group Selection and Neural Constructivism, which suggests that those populations undergoing cell death suffer from the lack of innervating current emanating from a shifting and transformed environment, be it natural or cultural. Implicit in this statement is that different distributions of sensibility produce different populations of **neurons**, neural network configurations and cerebral architectures resulting from how their populations of **synapses** are differentially stabilized, excited, or pruned by changing **cultural** contingencies and dispositions. In this context, virtual platforms, the World Wide Web, and the **Internet of Everything** present designed intense flows of images that out-compete naturalized images for the subject's attention.

ARCHIVE An **archive** is a collection of primary source materials or events stored in the form of documents and/or virtual records relating to a specific place, people, organization, or government **agency**. In some cases a selection of this material is stored and preserved in such places as national **archives**, as well as museums and libraries, where researchers and archivists can have access to them.

Michel Foucault sees **archives** in a much different way, as expressed in his seminal book *The Archeology of Knowledge*, namely, as a means to create discursive rather than objective discontinuities, and as a means with which to understand transformational processes and change. It is meant to supplement three other terms in Foucault's epistemology: statement, discourse and epoch or episteme. While discourse or episteme delineate processes of permanence and

similarity, ***archive*** designates processes of difference and incongruence. Foucault states that the **archive** defines that which can be enunciated and is a system of enunciability. As such "The **archive** is first the law of what can be said, the system that governs the appearance of statements of unique events. But the **archive** is also that which determines that all these things said do not accumulate endlessly in an amorphous mass..." (Foucault 1969/2002). By inference then the **archive** is also what a specific culture deems worthy of forgetting.

Jacques Derrida, in his book, ***Archive*** *Fever: A Freudian Impression* (1995), understood the **archive** as an institutional domicile and a place that gathers together signs and destroys difference. For him, the **archive** obliterates the raw purity and "archontic" primacy of difference by censoring heterogeneity and limiting what can be memorized, experienced, repeated, or reproduced. By co-opting attention, intensifying **saliency** and disseminating, performing, and repeating class-related culturally important objects, things, and their linguistic and symbolic referents, the **archive** attains political status.

As Knut Ove Eliassen has pointed out in his *The* ***Archives*** *of Michel Foucault*, the **archive** and its technologies have become increasingly important in the humanities for the following reasons: 1. New forms of digital scanning, photography and video have changed the location and accessibility of **archives**. Firewalls have replaced stone walls. We all sit in front of a magic screen opening us to a world at our fingertips. 2. **Archives** are no longer passive repositories of knowledge but act as **nodes** of attraction gathering information and data on those that enter and leave its domain.

In **cognitive capitalism**, in which the brain and mind have achieved increased importance in the life of the laboring subject, the site of archivilization is

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both extra and endo-cranial. Joining its definition as **accumulation**s and operations occurring in the world of things, objects and their relations as well as statements, the **archive** becomes a site social and personal mnemotechnics. An **archive** of short and long term memories act as the repositories from which memories are activated, modulated and redirected for use in **working memory** to produce scenario visualizations and symbolize their material inscription. **Working memory** is sometimes referred to as the "mind's eye" and is related to what Gilles Deleuze refers to as the image of thought. **Working memory** is situated predominantly in the prefrontal and parietal cortex, although the entire brain may be involved indirectly. As the name suggests, **working memory** describes those memories that form the **archive** of mental images, which have the potential to be activated to partake in a particular mental task. It is through the rules and regulations of their recording, selection, programming and activation that the procedures of governmentalization in **cognitive capitalism** operate intensely and to a greater extent than ever before. **Memory** technics, like the method of loci, have been around since at least the first millennium BCE and were used to enhance recall by linking memories to individual or assemblages of architectural constructions upon which a **memory** journey could be internally enacted. As architecture is itself political these earlier times were also part and parcel of a **political economy**. However with the brain and mind being the new focus of capitalist expansion, commoditization and **recuperation**, the stakes for engaging and increasing the **surplus value** of cognitive labor have intensified making the machinery of **memory** ever more essential to the **apparatus** of **neural capitalism**. Taylorist corporal management, characteristic of **Fordism** and even **Post-Fordism**, delineated by the idea of biopolitics, has been subsumed and

redirected to a system of relations directed to organize and optimize cognitive labor described as **neuropower** or neurobiopolitics. It is an essential component of self-governing and the endocolonization of thought. The neural **archive** is also archontic.

ARTIFICIAL GENERAL INTELLIGENCE Steven Wozniak developed the Coffee test to differentiate **Artificial Intelligence** from **Artificial General Intelligence**. A robot entering a room to make coffee has to find all the tools it would need to do so, understand how they work and in what order to complete this task of making a cup of coffee on its own without being reprogrammed. Whereas most AI programs are programmed for a specific task and are usually quite good at, equaling or surpassing a human being, its intelligence is not general and when you want it to do something else you need to reprogram it. Some researchers refer to **Artificial General Intelligence** as "strong AI" or "full AI"; others reserve "strong AI" for machines, which are capable of experiencing consciousness.

ARTIFICIAL INTELLIGENCE (AI) The term **artificial intelligence (AI)** was coined by John McCarthy in 1956 as meaning the science and engineering of making intelligent machines. According to the *New International Webster's Comprehensive Dictionary*, AI, as the term is used today, concerns the field of study that produces computers that can engage with human-like thought processes such as learning, adapting, and self-correction attaining in some instances consciousness. AI can be divided into two categories: Strong AI and Weak AI. John Searle coined the term strong AI as part of his strong AI hypothesis. He used it as part of his Chinese Room Argument in his paper of 1980, "Minds, Brains and Programs." In Strong AI, the purpose is to build a machine that can think "like humans," have consciousness, and feel.

Transhumanists and Extropians believe that Strong AI produces opportunities for human consciousness to be shifted into machines for perpetuity and possibly to even replace it. Some researches refer to strong AI as full AI or Augmented **Artificial Intelligence** in which a machine has the ability to perform a "general intelligent action." In Weak AI, the purpose is to create a tool for accomplishment of a limited task, which it does very well at the expense of a broader and related capacity. It does not make any claims to replace the human mind. A recent addition to AI terminology is what is called "Alien-AI," in which the purpose is to build intelligent machines, but ones not necessarily based on human intelligence but which are also intelligent. A related goal of AI is the production of "Super Intelligence," in which faster electronic components are substituted for the slower biological materials of **neurons** in smart ways in order to build better and faster brains.

ARTIFICIAL NEURAL NETWORKS (ANN) **Artificial Neural Networks (ANN)** are biologically inspired computational **algorithms** or simulations that metaphorically mimic existing neural structures in the brain and peripheral nervous system such as the **retina** of the eye. Their structure assumes the following: 1. Information occurs at simply constructed artificial **neuron**-like elements. 2. Signals are transmitted between these elements, and their connectivity patterns can either be supervised or unsupervised. The efficiency of their connections is described as a "weighted connection link." 3. Each **neuron** has the capacity to determine and output signals.

The structure of an Artificial Neural Network is made up of an input layer made of input **neurons**, a middle layer called the "hidden layer," and, finally, an output layer consisting of output **neurons**. In the neural network each **neuron**, with the exception of the

input layer, receives and processes information from a preceding layer. In feed-forward networks, information enters the ANN and some action is performed upon it (much like the action of the rod or cone of the **retina** when light stimulates it). The information is then passed on to the next **neuron**, which may be weighted according to different statistical likelihoods of activation. These weights can be positive or negative therefore responding to the information in differential ways. This process then continues according to the **complexity** of the network. Finally, it is outputted.

More realistic models of neural networks of the brain are more complicated and they implement, in addition, feedback and recursive loops into the hidden layer which can then send signals in both directions, either back to the input layer, or continue to the output layer. A learning **algorithm** can be instituted from the input to the output so that the more efficient route is reinforced. Thus, ANNs can be trained for a desired function, for example, finding a visual pattern that corresponds to the shape of a cat. When the ANN is unsupervised, it starts adjusting its weights according to its own idiosyncratic structural proclivities in relation to the specific situation and task. This represents a form of artificial cognition.

ARTPOWER

> "I think radical practices can, at most, modify behavioral structures of perception in linguistic and symbolic exchanges and in institutional and ideological formations—those are the parameters in which **cultural** practices can intervene." On the Whitney Independent Study Program, Benjamin D. Buchloh, October, 168, Spring 2019.

Artpower is defined in accord with Gerald Edelman's view that art and culture generate diversity in the form

of complex environments that couple to the brains own inherent **variation**. Early in its postnatal development, the brain harbors a tremendous amount of neural diversity at various levels of the nervous system. This consists of the number of **synapses**, their capacities for change, tuning capabilities, forms of connectivity, and the patterns and distributions of neurochemicals like dopamine and serotonin. According to Olaf Sporns, in his article "Selectionist and instructionist ideas in neuroscience" (Sporns 1994), **variation** in other systems can represent **noise** and degrade performance. However, the opposite is true for neural selectional and constructivist systems. The brain's variable population of neural elements with variable characteristics and tuning personalities facilitate differential responses to unknown environments. In such a variable population of **neurons**, there is a differential amplification of those elements most in sync with the sensational distributions found in the environment that excite them. Cell death, or **apoptosis**, occurs for those other neural elements not so aroused. The newborn can never know the world in advance; human culture and its artifacts are constantly changing from generation to generation. Consider how digitalization has changed the socio-**cultural** environment with which we interact. Parametric architecture is one such notable example but mobile phones are also means through which we find our way in the spatio-temporal composition of the real as well as the new computationally designed urban space. In order to maintain functionality over generations, the brain is never completely pre-specified for a predetermined arrangement of sensibility. Instead, it must harbor the potential capacity to react in accordance with different arrangements that it might experience. This capacity for change is a result of its **neural plasticity** and **variation**. I would like to extend the definition of Benjamin D.

Buchloh's quoted above, from perceptual capacities in linguistic and symbolic interactions to cerebral cognitive ones. **Artpower** is then the potential capacity of art and culture to fold, disrupt and estrange the sensible and insensible environment as well as its material and immaterial dimensions resulting in the production of analogous neural architectonic structures through the so-called sculpting of the brain's neural **variation** and plasticity. As such, in its most utopian guise, **artpower** celebrates the emancipatory capacity of its artistic and **cultural** production as a means to induce a parallel emancipatory neural material **agency**. Importantly these modifications coevolve together as the world, body, brain and mind are entangled.

ATTENTION ECONOMY The **attention economy**, according to Thomas H. Davenport and John C. Beck, in their book, *The **Attention Economy**: Understanding the New Currency of Business* (2001), refers to a condition accentuated by postindustrial economies in which attention becomes a more important currency than money. In his 1971 lecture, "Designing Organizations for an Information-Rich World," Herbert Simon suggested that it is not only knowledge and information that become central to production in knowledge-based economies, but, also, the attention necessary to process them. The abundance of information generated by the Internet creates a poverty of attention and a need to allocate it efficiently. According to Michael E. Goldberg, the Internet is a privileged site of attention because of its ability to distribute information in an audiovisual, cinematic form, and the capacity of **Big Data** to collate and measure the attention it captures. As a result of the extensive amount of information produced by **communicative capitalism** and the World Wide Web—which now surrounds us and requires of us our attention—the brain's limited neurobiological processing capacity has been exposed as insufficient, requiring at times pharmaceutical support. Recently, the importance of paying attention as a form of new laboring in post-industrial societies and as a part of the **political economy** has become appreciated. Jonathan Beller, in his book, *The Cinematic Mode of Production: **Attention Economy** and the Society of the Spectacle* (2006), contends that with our extensive use of the Internet, attention has become a tool of capitalist exploitation and has been instrumental in the "massification," or homogenization, of society. Furthermore, he posits that, like his or her **proletariat** counterpart experiencing the **alienation** inherent in industrial capitalism, the **cognitariat** participating and laboring in **cognitive capitalism** experiences an **alienation** of spectatorship resulting from the fractalization of visuality in post-industrial networked viewing. Christian Marazzi, in ***Capital** and Language* (2008), has further expounded the importance of attention as an **apparatus** of capital's control over life in the way it alters the circuitry existing between labor time and leisure time. **Clickbait**, as utilized to attract the attention of the Internet user to **affect** their performance, has been deployed by advertisers, and the **alt-right** equally, to spread their agendas. The subject clicks on a sensational, exaggerated, and eye-catching headline, such as those used to spread the **fake news** story known as "**Pizzagate**," that then takes them to a certain webpage —all the while, being surveyed and recorded by the **algorithms** and software agents compiling **Big Data**. Essential to an understanding of the **attention economy** is Bernard Stiegler's distinction in *Technics and Time, 3, Cinematic Time and the Question of Malaise* (2011), between deep and hyper attention. Attention is an epigenetically derived result of the actions of networked and simultaneously acting generationally specific forms of technical **exteriorization** that mold neurobiological analogues forming a

techno-organic circuit. Deep attention or as he refers to it, literal attentional form, describes the attention that emerged in the age of the modern press whereas hyper attention describes the new attentional form that emerges in our moment of digital technology and global mass media. Attention is hyper-industrialized in the twentieth century as a result of the massive **accumulation** of new audio-visual technologies like cinema, television and digital media that together cause what Stiegler calls the industrialization of consciousness.

AUGMENTED REALITY Morton Heilig's motorcycle simulator called Sesorama, designed in 1962, is often designated as the earliest example of an immersive multi-sensory technology. It was not until thirteen years later that the first example of an **Augmented Reality** system, in which a user was allowed to interact with a virtual object, was realized. **Augmented Reality** is a **variation** of **Virtual Reality** but is not **Virtual Reality**. The basic difference is that in **Augmented Reality** the user is not totally immersed in a synthetic environment. Rather, **Augmented Reality** takes images or sensorial sensations generated by computer and digital information and overlays them upon a real-time environment. In other words, virtual objects are superimposed upon the real world with the user being totally cognizant of it. In some instances like heads-up displays, fighter pilots use information like artificial horizons, digital altitude and speed to fly a jet fighter. The three essential components of **Augmented Reality** are therefore: 1. It combines real and virtual information. 2. It is interactive in real time. 3. It operates and is used in a 3-D environment. **Virtual Reality** and **Augmented Reality** are becoming more and more important in the work environment. They represent important components of what is referred to as the **hyperreal**. As digitality becomes more a way of life, especially in our post-COVID times,

this **simulacrum** will come to substitute for the real and will take the place of the distribution of sensible to become a powerful force in policing the senses of the **multitude** transforming them into a people.

AUTONOMY **Autonomy**, in the classical context born out of or in the '**zeitgeist**' of the French Revolution, is the emphasis on 'self-rule' as opposed to being ruled by another (heteronomy, in Kant's terms). Some understood **autonomy** in this sense to mean the use of our reason (rather than the reliance on traditional forms of authority, whether political or religious). Others understood it in increasingly radicalized projects, leading to the 'autonomist' movements of 1960s Italy. According to Franco "Bifo" Berardi, in *The Soul at Work: From **Alienation** to **Autonomy*** (2009), **autonomy** confronts the notion of the Hegelian historical subject and replaces it with the idea of subjectivation. Subject formation is the consequence of disciplinary measures upon a member of a specific economic class, combined with the effect of an environment of continuous change consisting of social relationships, sexual identification, and dis-identification. **Autonomy** understands subject formation as the flip side of the process of normalization: it foregrounds struggle, resistance, withdrawal, and lines of flight for escaping from the capitalist system of domination. Together, these features conspire to produce an alternative subject. **Autonomy** rejects the synchronous and melodic temporality posited by capitalism for one that is singular and, at times, noisy. The importance of collective political organizations to this process cannot be overestimated. In *After the Future* (2011), Franco Berardi states,

> During the 20th century, social struggle could change things in a collective and conscious way because the industrial workers

> were able to create solidarity and unity in daily life, and so could fight and win. **Autonomy** was the condition of victory, because **autonomy** means the ability to create social solidarity in daily life, and means the ability to self-organize outside the rules of labor and exploitation. Autonomous community was the condition of political strength. When social recomposition is possible, collective conscious change is possible . . . In conditions of social recomposition social **autonomy** from **capital** becomes possible. The new economy with its fractalization of labor and life has broken solidarity at its roots and has made this recomposition almost impossible.

AUTOPOIETIC SYSTEMS The idea of autopoiesis emerges from the theory of cybernetics that predated it in which interrelated feedback systems preserve the core patterns and identity of a closed organization. As formulated by the Chilean biologist, Humberto R. Maturana, in "The organization of the living: A theory of the living organization" (1975), and, later, with his co-author, Francisco Varela, in their book, *Autopoiesis and Cognition: The Realization of the Living* (1980), **autopoietic systems** are autonomous living systems that are self-producing and recursively utilize their own component parts for that production. These systems, thus, distinguish living from non-living systems, which do not utilize such systems of production. The living cell is one example of an autopoietic system, as it produces its own components like proteins and lipids rather than importing them from outside the cell. The term "operatively closed" is used to describe such a system, although this closure refers only to the base operations; it does not preclude interactions of the system with the outside world, something Varela and Maturana call

"interactional openness." For instance, these entities depend on matter and energy to exist, but their flow inside and outside the system is regulated. The combination of closure and openness is particularly important when considering cognition. This leads to the idea of "Radical Constructivism" in which cognition is considered as an autopoietic self-referential system, and all ideas or cognitions are constructs of that particular cognitive system.

Of significance as well is Niklas Luhmann's adaptation of some of the ideas of autopoiesis for understanding social structures, his so-called "general trans-disciplinary concept" of autopoiesis. Particularly relevant is his desire to understand the importance of non-living **autopoietic systems** reflected in social and psychic systems. While living systems reproduce themselves on the basis of life, social systems reproduce themselves on the basis of communication, and psychic systems operate on the basis of consciousness.

AYAHUASCA **Ayahuasca** is also known as "daime," *yajé*, "natema," and "vegetal." It is a psychotropic plant infused tea used by **shamans** and made from the extract of the *Banisteriopsis caapi* vine, either alone, or in combination with the leaves of the *Psychotria viridis* (or *Diplopterys cabrerana). Psychotria viridis* and *Diplopterys cabrerana* contain DMT (dimethyltriptamine), a compound structurally similar to the neurotransmitter serotonin, which binds to not only the 5-hydroxy- tryptamine 2A receptor—as serotonin does—but, also, to a metabotropic glutamate receptor or mGlu2 receptor to produce a dimer responsible for the intracellular cascade and its hallucinogenic effect. Like other psychedelic compounds such as mescaline and LSD (lysergic acid diethylamide), it acts as an agonist to incite hallucinatory effects, but it has other properties that are important as well. In my essay, "The **Brain Without Organs**, **Ayahuasca** and the

Theory of **Neural Regression**," I outline many of these other properties. For example, the drug has been shown to stimulate neurotrophic and transcription factors associated with **neural plasticity**. It disrupts top-down processing by suppressing the modulating activities of the prefrontal cortex that normally promotes convergent thinking, or the generation of a single optimal solution at the expense of all others. In turn, **ayahuasca** promotes **divergent thinking**, solving a problem from the many possible solutions that are available at a particular time. It is also responsible for what I call "**neural regression**," a process by which older and more phylogenetically ancient parts of the brain can become active and express themselves as a consequence of frontal cortex suppression resulting from the action of **ayahuasca**.

BACK PROPAGATION LEARNING (BPL) **Back propagation learning (BPL)** is one type of supervised learning that occurs in **artificial neural networks** (ANNs). In BPL, the difference between the expected outcome of the learning session and the actual output of the learning session is kept to a minimum.

THE BALDWIN EFFECT **The "Baldwin effect"** is named after an early 20th-century psychologist, James Mark Baldwin. He first described this "effect" in his article, which received relatively little attention at the time, entitled "A New Factor in Evolution" (1896). **The Baldwin Effect** is strongly debated, as it links **cultural evolution** and biological evolution. It acts as a bridge between the genomic based theory of Charles Darwin's Theory of Evolution by Natural Selection and Jean-Baptiste Lamarck's, Theory of Inheritance of Acquired Characteristics. The broad claim made by Baldwin and others, more recently Terrence Deacon, is that learning can change the environment for a species in such a way as to influence the selective environment for the learned behavior or some closely related character. That is, **the Baldwin effect** was meant to address the possibility that traits which are not strictly biological could be transmitted via learning and other **cultural** practices acting upon a polymorphous assortment of individual **variations** in the **gene** pool. Implicit individual genetic **variations** not relevant in one sociological context could give selective advantage in another and if that sociological context is stable over generations could act on the conspecific **gene** pool to skew it in favor of that particular genetic **variation** which first becomes fixed as an acquired trait and then inheritable. Biologists and other discussants of this effect do not agree on which are its specific outcomes, but typically it is pointed to as a way to account for the rapid evolution of language and mind. As Deacon proposes, once a few members of a population developed the ability to communicate symbolically, the great advantage of such an ability would in itself create intense selection pressures promoting its further evolution—this formulation appealed, of course, to thinkers defending a "meme"-based theory of **cultural evolution**. Another important feature of recent biological research focusing on ecosystems, namely niche construction, can also be seen as "a" Baldwin effect, since it allows for **cultural** modification of 'biological' environments with durable effects. However dissenting figures, like the eminent evolutionary biologist G.G. Simpson, felt that even if **the Baldwin effect** existed, it would actually have no effect on evolution overall.

BASE AND SUPERSTRUCTURE Using an architectural model, that of a building, Marx and Engels proposed a metaphor by which society can be divided into two components: a base, in which value is produced *via* internal labor/ **working class** relations, and in which the structural

dynamics of production are manifested; and a superstructure, in which the ideological mechanisms that guide social relations (e.g. political, legal, even religious regimes) are actuated. In other words, each social organization and ideological superstructure evolves out of the preponderant form of commerce operating at that time. Superstructure indicates a dependent form supported by the base, or foundation, which is not self-generated or autonomous. On the surface, this relationship may appear to be a form of economic determinism; however, Marx includes in this concept the notion of historical form. Different forms of capitalist production constitute different forms of spiritual production and *vice-versa*. In **cognitive capitalism**, the normal constitutive relations that characterized early economic systems are flipped: the base, rather than subsuming the consciousness, is, in fact, dominated by it.

BEREITSCHAFTSPOTENTIAL OR READINESS POTENTIAL (RP) In 1983, the neuroscientist Benjamin Libet measured the role of consciousness in the generation of motor acts important for movement. He found a premovement buildup of electrical potential in the supplementary motor cortex, as measured by an electroencephalogram (EEG) machine, 550 milliseconds before the movement's initiation. Unexpectedly, the actual consciousness of this so-called "urge to move," emerged 200 milliseconds before, with a time lag registered as 350 milliseconds. In other words, there was a 350 millisecond time lag between the initiation of the **Readiness Potential** and the decision to actually flex. The conscious awareness represented, in his mind, the **emergence** of a conscious will which could act either to allow or block the volitional action to go on. This was called "volitional veto." Libet suggested that unconscious processes were the true initiators of volitional action. He further suggested that even though consciousness was not as important as it was once thought to be in initiating action, it still performed the ability to modulate an action by withholding and suppressing the flow of discharges initiated by the unconscious on its way to the motor cortex. Recent research by Alexander et al. in their article, "Readiness potentials driven by non-motoric processes" (2016), have questioned the role of the **Readiness Potential** in eliciting movement and suggests that it rather signifies general anticipation or background **noise**.

BIG DATA Credit for coining this term must be shared. In particular, John Mashey et al. at Silicon Graphics produced highly relevant (albeit unpublished), non-academic, work in the mid-1990s concerning large flows of data. According to Thomas H. Davenport in his later book, ***Big Data*** *at Work, Dispelling the Myths, Uncovering the Opportunities* (2014), the term **big data** is, in many ways, a misnomer because what is most important about this term is not its size, but rather the way the incredible amount of information we now have access to is processed. He goes on to address what he considers to its most important component, which is its lack of structure. Raw data has no value and it needs to be processed to be valuable. Much of the literature on **big data** addresses three of its components: its so-called three Vs: its volume, variety and velocity (although other Vs have recently been added including veracity and value). There are many forms of **big data** styles, which are linked to corresponding sources of the data that are associated with various industrial contexts. According to Davenport, large volumes of data are generated by online sources, for instance, in financial services. Unstructured data emanates from video feeds and is important to the healthcare industries. Data that is flowing continuously is characteristic of sensorial sources and is important in manufacturing.

One form of data important in **cognitive capitalism** is sensorial data. In 2011, the number of

networked devices overtook the global human population, and it is estimated that by 2025, through the **Internet of things (IoT)**, fifty billion sensors will be connected to the Internet. Not only are these sensors being connected to refrigerators, TVs, security systems, and thermostats, but, also, cows (so-called "digital cows"), and humans as well, for reasons of health and fitness. Increasingly, this field of personal analytics is extending into the realms of work and life satisfaction. Wake Mate, MyZeo, and BodyMedia are even peering into the quality of one's sleep, and, who knows, some day even our neural patterns may be monitored.

BIG OTHER According to Shoshona Zuboff in her book *The Age of **Surveillance Capitalism**: The Fight for a Human Future at the New Frontier of Power* (2019) the **Big Other** is the result of ubiquitous digital **apparatus**. Formed through a network of omnipresent mediated connections it gathers sensate information as data that when combined creates an overreaching surveillance logic that in the end normalizes uncertain behavior. It produces instrumentarian power, "replacing the engineering of souls with the engineering of behavior." (Zuboff, 2019) It uses radical indifference to accomplish its goals reducing human experience to something measurable and calculable. Not even the future is beyond its grasp. "**Big Other** poaches our behavior for surplus and leaves behind all the meaning lodged in our bodies, our brains, and our beating hearts, not unlike the monstrous slaughter of elephants for ivory." At this time the data collected and processed is the result of the **cognitariat**'s actions in the smart environment or performed on a touch screen or keyboard. With the advent of such technologies as Neuralink access to data will change. Our thoughts will substitute for our fingertips and digital labor will be instigated by our judgments coded in the form of brain waves. Our

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memories and the processes of scenario visualization taking place in our mind's eye will be commoditized.

BINDING Two kinds of **binding**, as described by the neuroscientist Wolf Singer in his article, "Coherence as an organizing principle of cortical functions" (1994), are of interest. The first is **binding** by convergence, or, as it is sometimes referred to, **binding** by conjunction of axonal projections. The second is dynamic **binding** by synchrony. In the first case, **gestalt** features found in the world are more commonly considered to be related to one another if they are contiguous in space and time. For example, they exhibit certain similarities, such as contours that touch each other, travel together, or coincide in time and are considered related to each other more so than those that are distant, share no common features or occur separated in time. Coarse coding of this type requires grouping by convergence of transformed populations upon a cell in the next higher order. This continues up the cellular hierarchy until, finally, the information converges upon a "grandfather cell." As one proceeds up this hierarchy, coding becomes more and more complex. These features are thus perceived as belonging to each other and are processed accordingly. Dynamic **binding**, on the other hand, is a selection and grouping strategy also known "relational coding," or "assembly coding," because, according to Singer, in his article review, "Neuronal Synchrony: A Versatile Code for the Definition of Relations?" (1999), the information about a particular conjunction is contained in the dynamically adjustable configuration of the enhanced responses of distributed **neurons**. Dynamic **binding** is related to **binding** by synchrony and suggests that synchronously distributed neuronal assemblies may result as a means to adequately represent attributes of the visual world that resonate together.

Could **binding** by synchrony provide a model for a neural correlate of consciousness produced by the seamless integration amongst multiple brain regions? Temporal **binding**, according to Francis Crick and Christopher Koch in their article, "Towards a Neurobiological Theory of Consciousness" (1990), is central to consciousness and may be the sufficient condition for conscious experience. **Reentry**, the ongoing, recursive parallel signaling between disparate parts of the brain, might be responsible for such rapid unified distributed processing.

Could art, design and performance—as a means through which to thwart institutional **binding**—produce alternative aesthetic criteria and perceptual dispositions that might alter what we process? Anne Treisman's Feature Integration Theory, which describes three forms of **binding** is important here. These are the **binding** of properties, the **binding** of parts, and perceptual grouping. These three conditions are important considerations for artists as well when they are considering strategies in making works of art. She states that attention is not a spotlight, which, as in a play, moves around a stage highlighting certain areas of action, but, rather, it is a window of consciousness selecting amongst possible **binding**s in a percept that is consistent with memories, biases, and expectations, in the broad sense of the word, that emerge from political, social, economic, psychic, and artistic concatenations that bind together with the objects and things of their making and form discursive assemblages. **Cultural** discourses have the power to mutate these relations resulting in realised dissident **cultural** actions, which emerge and describe a multiplicity of artistic interventions. Could these, then, engage the **neural plasticity** of the brain stabilizing alternative assemblages of labile **synapses**? In their article, "Neural Synchrony and the Development of Cortical Networks" (2010), Uhlhaas et al. indicate just that and call attention to the fact that synchrony is important for the production of neural circuits and networks, and **neural plasticity**. They write:

> The development and maturation of cortical networks critically depends on neuronal activity, whereby synchronised oscillations play an important role in the stabilization and pruning of connections.

Synchronized resonances play an important role for Excitatory Post-synaptic potentials and Long Term Potentiation (important for **memory**).

When scaled up to millions, if not billions, of connections resulting from interactions with a reconfigured *habitus* estranged, aesthetically driven, existential networks produce estranged, synchronized oscillations (and the neural plastic changes they incur). Could these emerging neural material relations resulting from artistic actions compete with comparable institutionally derived oscillations for expression of an alternative consciousness? I am wagering that this, then, could be the very conditions for **dissensus** in our age of **cognitive capitalism**.

BIOPOWER Gradually, a violent sovereign power has been replaced by the power that Michel Foucault, in *The History of Sexuality: An Introduction* (1976/1984), calls "**biopower**." Its task is to take charge of bare life—the sheer biological fact of life, or *zoe*. The logic of **biopower** is not reduction, but production: "It exerts a positive influence on life, and endeavors to administer, optimize, and multiply it." Instead of being exercised by means of law and violence, **biopower** is exercised through normalizing biological, psychological, and social technologies. Unlike sovereign power, it

does not celebrate death. On the contrary, **biopower** wants to exclude it. Death is no longer the way in which power expresses itself, but, rather, its absolute limit. Instead of death, the focus of **biopower** is centered on the improved birth and life of individuals and populations. In **cognitive capitalism**, **biopower** is subsumed by **neuropower** with its focus on optimizing and normalizing thought. The capacity to think freely or rationally is an epiphenomenon of the struggle through which the socio-**cultural** environment, body and the neural substrate are entangled. Relying on such material abilities as **neural plasticity** and processes such as epigenesis, neuropower delineates the social and political process(es) through which the **neural zoe** is transformed into the neural bios, or the brain's **primary repertoire** into its **secondary repertoire**. The **secondary repertoire** is the result of the action of environmentally induced pressures upon the variable and plastic material brain in its most sensitized state. **Neuropower** transforms the **neural zoe** into the neural *bios*, or the **primary repertoire** into the **secondary repertoire**. The **secondary repertoire** is the result of environmentally induced epigenetic forces sculpting the variable and plastic nervous system in its most sensitized state. The so-called neural *bios* is the politicized brain. Like **biopower**, **neuropower** can either create submissive or emancipated populations of subjectivities.

BODY WITHOUT ORGANS (BwO) The **Body without Organs (BwO)** was first conceptualized by Antonin Artaud and the idea was further analyzed and expanded by Gilles Deleuze and Félix Guattari in *Anti-Oedipus* (1972) and *A Thousand Plateaus* (1980). It describes a body that is totally unfixed, like a **teratoma**, or a heterodox body at variance with official doctrine. In this body, the organization of organs—from their cellular structure, to their relationship with other organs, to their relationship with the organism as a whole—is free from the despotism of the body's overall plan. In other words, it is free from the rules and regulations of the a priori program situated in the DNA code. In **cognitive capitalism**, in which the mind and brain are the new factories of the 21st century, the power of the **body without organs** as a method of resistance has been diminished as a form of opposition and dissensus.

BOT A **bot** is any software application consisting of a selection of machine learning **algorithms** that runs automated tasks on the Internet. It is assumed that fifteen percent of all **Twitter** accounts active in the 2016 US election cycle were **bots**. **Facebook** was also affected. A "chatterbot" is a special kind of social media **bot** that is present on social media accounts and which uses its special machine-learning based **nature** to generate certain ideas that support specific interests. It has the capacity to convince a user that it is a real person and improves its own knowledge and response repertoire through its interaction with humans. Social **bots** can appear to act like a follower or Internet persona, and, in some instances, operate as a fake account that tricks its users. In this way, its actions can be seen as malicious or unethical.

BOTTOM-UP PROCESSING **Bottom-up processing**, as opposed to top-down processing, is a model for sensorial processing found in the visual system as well as in **artificial neural networks**. In top-down processing, or conceptually driven processing as it also called, belief systems and expectations can **affect** primary perceptions streaming in from peripherally located sensorial apparatuses like one's eyes and ears. In **bottom-up processing**, identification of lower-order components facilitates their subsequent production into higher-order forms. Hierarchical processing provides a

strong example. At the lowest level are pixels, which are combined to define primitives such as arcs and line segments. These are then combined to create letters, and at the next layer, words. The higher up we go, the more abstract the representation. **Emergence** plays a role in **bottom-up processing** as the whole that results can be greater than the sum of its constituent parts.

The term **bottom-up processing** has taken on other meanings in other spheres of knowledge. For instance, bottom-up processes also serve as a metaphor for **emergence** in self-organizing social systems. The **bottom-up processing** refers to **agency**, whereas top-down processing refers to structure. Important for us here, is **emergence** as an agential counter strategy to that of strict determinism of structure. Authors such as Anthony Giddens see agents and structures as sharing equal ontological status.

BRAIN-COMPUTER-INTERFACES (BCIs) **Brain-computer-interfaces (BCIs)** are neuro-technological systems that mediate electroencephalographic signals (like P300 potentials and *mu* or *beta* rhythms recorded from the scalp, or intracranially) between the brain and various devices, such as computer terminals. At the present moment, they have been successfully applied to aid so-called "locked in" patients who are quadriplegic, and, therefore, unable to move or verbally communicate on their own because of lower brain stem injury. These patients' **cerebral cortex** is intact, and, in some cases, patients can learn to communicate through eye movements. With aid, BCI patients can learn to control their brain waves, and, thus, can learn to express their wishes to caregivers, or even operate word processing programs or neural prostheses. Video released by Brown University shows a locked-in patient using BCI to operate a robotic arm in order to autonomously drink a glass of water. These systems are also finding application amongst healthy and typically-abled people: The Emotiv EPOC, for example, is a revolutionary high resolution, neuro-signal acquisition-and-processing wireless neuro-headset. Using sensors to tune into electrical signals produced by the brain, it can detect brainwave patterns for thoughts, feelings, and expressions. These data can then be transmitted wirelessly to PCs, tablets, smartphones, **virtual reality** and—soon—to the **Internet of Everything**. Neuralink, a company founded by Elon Musk, aims to use many of the discoveries of BCI to link the brain to digital intelligence in order to make human beings super intelligent. Slavoj Žižek in his book *Hegel in a Wired Brain* (2020) describes the sinister political implications of this technology or what he calls the 'wired brain.' "'Wired brain' refers to a direct link between our mental processes and a digital machine, a link which, while it enables me to directly trigger events in reality with a mere thought...it also enables the digital machine to control my thoughts." In my forthcoming essay "Simulated **Memory** and the Wired Brain" I have suggested that brain-computer interfaces and other associated technologies will lead to a condition called **neural subsumption** in which our thoughts, both conscious and unconscious, are made legible and digitally alive. As such the transparent workings of the mind will become opaque and subject to the sovereignty of **Big Data** and what Shoshana Zuboff calls the **Big Other**.

BRAIN FINGERPRINTING In his text, "**Brain fingerprinting**: a comprehensive tutorial review of detection of concealed information with event-related brain potentials" (2012), Lawrence A. Farwell describes a new scientific methodology for detecting "concealed information stored in the brain by measuring electroencephalographic brain responses, or brainwaves, non-invasively using sensors placed on the scalp."

Words, phrases, or pictures containing relevant information concerning, for example, a crime or situation of interest are presented to a subject on a computer screen with other irrelevant information at the same time that the EEG is being monitored for characteristic brain wave patterns. When the subject recognizes something as important or salient, a characteristic brain wave pattern, known as a P300-MERMER, is provoked and constitutes a positive determination that the information is present in the brain. If not, then, accordingly, the information is absent. **Brain fingerprinting** is used by many state power institutions like the FBI and CIA, and is considered admissible evidence in some courts of law. Along with analysis of gait, fingerprinting, iris morphology, and face recognition, **brain fingerprinting** is a component of what was termed by the US Defense Department as Total Information Awareness (TIA), or Terrorism Information Awareness. As part of the War on Terror, TIA attempts to gather information about individuals in order to anticipate any crimes they might commit before they commit them. Although the program was defunded in 2003, the software created is still used as part of the programs instigated by the National Security **Agency**.

BRAIN WITHOUT ORGANS (BrWO) Superimposing Deleuze's idea of the **Body without Organs** onto a notion of the brain, one could say that a **Brain without Organs (BrwO)** does not lack modules, hubs, and verifiable cognits—it simply lacks the organism. That is, a particular organization of organs. Thus the **Brain without Organs** is, itself, an indeterminate organ and neural plasticity is its agency. The brain, as the term is used here, is defined by the material brain inside the skull, the situated body, and the world; the so called extra-cranial brain, composed of an assortment of evolving objects and things; as well as the socio-cultural and technological

relations that embrace them and give them meaning. Thus, the definition of the **Brain without Organs** is broadened to encompass these extra-cranial processes, especially those invented and operating upon our knowledge, information and cyber-cultures.

The **brain without organs** as a source of difference and change must now and in the future face the normalizing and homogenizing capacities of the digital networks at large in neural capitalism. These form the new platforms of the extra-cranial brain, with its specialized apparatuses, invented in the laboratories of neuroeconomic and neural consumer research as well as those of DARPA, to sculpt the cognitariat's neuralplasticity in the production of the perfect optimized consumer and soldier.

BRETTON WOODS SYSTEM The **Bretton Woods System** refers to an agreement formulated as part of a conference held in Bretton Woods, New Hampshire in 1944 to help reconstitute the shattered economies of Europe resulting from two world wars and to encourage international economic cooperation. Two significant results were the establishment of the International Monetary Fund (IMF) and the World Bank. Importantly, the participating countries collectively set up a regulated system of fixed exchange rates disciplined by a US dollar tethered to a gold standard. In 1971, the United States terminated this convertibility of the US dollar to gold, thereby bringing the system to an end: a move that became known as the "Nixon Shock." The dollar thus became a fiat currency no longer based on a physical commodity, and, thus, its value became undetermined and free-floating. Franco Berardi, in his book, *The Uprising* (2012), draws attention to this moment as an act of *dereferentialization* in the realm of the monetary economy. By breaking the Bretton Woods Agreement, the American president was saying that the dollar would no longer correspond to a

gold standard or economic referent but rather its value would henceforth be decided by an act of language. Recently Berardi has again returned to this subject in his essay "Meme-Swarm and Microtrading" (2021) in which he draws on the work of Christian Marazzi in his book ***Capital*** *and Language* (2008) to make the point that more and more **capital accumulation** is the result of the effect of language. Furthermore he finds a connection between the delinking of the dollar to the gold standard to that of the delinking of the sign to the signifier. As a result the distinction between the real economy and monetary economy broke down leading to volatility in the markets.

BUZZ According to David Joselit in his book *After Art* (2013), in the networked society **BUZZ** replaces aura in the characterization of a reproduced artwork. Aura as introduced by Walter Benjamin in his "The Work of Art in the Age of Technological Reproducibility" (1935) relates to a work of art's unique existence in a particular place as well as its historical testimony that is carried back and forth in history and into the future. This aura constitutes an artworks capacity as an agent of historic and dialectic **materialism**. Quoting Joselit, "According to Benjamin, aura results from site specificity. It is because the work of art belongs to a "time and space" that it can possess the authority of witness. Reproduction jeopardizes "the historical testimony" and the "authority of the object. " When the emphasis shifts from a single object to a population of images existing everywhere rather than a single place a series of emerging mutations takes place that has significance for how value through images is produced. When a swarm of images like a swarm of bees achieves saturation the context shifts from site specificity to a place of **emergence**, far from equilibrium, in which the extensive relations shift to **intensive** ones. According to Joselit **buzz** indicates a moment of becoming in which discrete movements are sufficiently in phase to produce a coordinated action in which above a certain threshold coherence emerges.

CAPITAL **Capital**, as the term is applied here, reflects the definition used in Thomas Piketty's book, ***Capital*** *in the Twenty First Century* (2013), which excludes human **capital** from its scope. In his reading, except during the time of slave labor, human **capital** cannot be owned. Instead, Piketty limits his definition to nonhuman **capital** which he calls simply "**capital**." It includes all forms of wealth that individuals can own and that can be traded or transferred through the market that, over time, may accumulate value.

Adam Smith's idea of **capital** includes the notion that investors expect to produce revenue from **capital** investments. In his writing, **capital** includes all forms of real estate property as well as professional and financial **capital** (consisting of plants, infrastructure, machinery and patents). According to Karl Marx, **capital** only exists as a result of the process of exchange, by means of the process of circulation itself.

Karl Marx in ***Capital***, Volume 3, understands that the productive process unleashed by capitalism is composed of two forms of **capital**: constant and variable. Constant **capital** refers to the means of production whereas variable **capital** consists of two components, raw materials or the material of labor and living labor. It the ratio between these two components that defines the organic composition of labor which because of its relation to evolving technological conditions is historically induced. Pierre Bourdieu, in his paper published in 1986, "The Forms of **Capital**," introduces two other forms of **capital** (in addition to an economically based definition), Bourdieu articulates the notion of "social" and

"cultural" **capital**. In doing so, he creates an analogy to a game of Roulette in which agents bounce like roulette balls. The **capital** generation process is understood as a series of singular disinterested events subject to chance and lacking any notion of historical **accumulation**. The idea of **cultural capital** arose from Bourdieu's analysis of the French education system in which he observed that success could not be disentangled from the economic and **cultural** heritage and the circumstances from which a student originated. In other words, the dominant predictor of future success in the educational system was the child's economic class and the degree to which the values taught at home synced up with those desired and disseminated by the culture as a whole. As such, **cultural capital** exists in three forms: the embodied state, in which **cultural** logics are etched into the brain and body as long-lasting dispositions; the objectified state, in which traces of **capital** exist in the form of **cultural** goods like books—in which the problematic of **cultural capital** itself is set forth and discussed; and, finally, an institutionalized state which provides the embedded forms of indoctrination necessary for success. Somewhat related to **cultural capital** is Bourdieu's idea of social **capital**, which is linked to an agent's ability to mobilize and maintain social networks, and the economic **externalities** they embody. He draws attention to the power of social **capital** as a multiplier effect on the **capital** one owns, in one's own right, as well as for the others who make up an individual's network.

CAPITALIST REALISM **Capitalist Realism** is a concept developed by Mark Fisher in his book, ***Capitalist Realism:*** *Is There No Alternative?* (2009). In its introduction, Fisher, referencing Fredric Jameson and Slavoj Žižek, states that it is easier to imagine the end of the world than the end of capitalism. This encapsulates the meaning of **Capitalist Realism**: the notion that capitalism is the only viable political and economic system and that it is impossible to even imagine any alternative to it. Although **Capitalist Realism** is close in meaning to postmodernism, Fisher prefers this term for three reasons. First, when postmodernism was developed, there were still real alternatives to capitalism—albeit they were in their waning days. Margaret Thatcher's slogan, "There is no alternative," was foreboding as to the reality of situation of the early 1980s, as well as a deeper and more pervasively neoliberal moment yet to come. Secondly, **Capitalist Realism** no longer confronts modernism in the name of difference, diversity, and multiplicity. Instead, it takes vanquished modernism as a fundamental trope and a foregone conclusion, understanding its reenactment and return as a hollow performance, not an ideal for living. Thirdly, we live in a world of what Fisher calls "precorporation; a pre-emptive formatting and shaping of desires, aspirations, and hopes by capitalist culture." In other words, in **Capitalist Realism**, the powerful subversive potential of art has been played out, and alternative, independent forms are simply the reenacted styles of a mainstream culture. Importantly, the term expresses the ontogenic capacity of capitalism to morph into new forms to fulfill new arrangements of expression relevant to its new contexts, challenges, and market expectations.
(see also **Multitude**)

C

CENTRAL NERVOUS SYSTEM (CNS) The **central nervous system (CNS)** is comprised of six parts of the body: the spinal cord, brain stem, midbrain, diencephalon, cerebellum, and cerebral hemispheres.

CEREBRAL CORTEX The **cerebral cortex** is a thin layer of gray matter tissue that covers the cerebrum. It is made up of six layers of cells and is called the "neocortex" which

is highly folded and characterized by gyri, or ridge-like forms and sulci or invaginations. Gray matter is made up of cell bodies of **neurons** with their attendant axons, **dendrites** and **synapses**, glial cells, and capillaries.

According to Vernon B. Mountcastle in his book, *Perceptual Neuroscience, The* ***Cerebral Cortex*** (1998), the enlargement of the brain in the evolution of mammals was due to the expansion of the **cerebral cortex**. The late neurobiologist, Peter R. Huttenlocher, in his book, ***Neural Plasticity*** (2002), has drawn attention to the important function of plasticity in the immature **cerebral cortex** and especially in those areas that subserve higher cortical functions including language, mathematical, and musical ability, as well as our executive functions. The **cerebral cortex** is an important site of action of **neuropower** and **neural capitalism**

CEREBRALITY **Cerebrality** is a term coined by Catherine Malabou in her book, *The New Wounded: From Neurosis to Brain Damage* (20012). It expresses the transition from a psychoanalytically inflected definition of psychic disequilibrium with root causes in sexuality, to one with root causes in cerebral destruction. The material brain is the nexus of cerebral functioning. **Cerebrality** delineates the damage of these functions to our psychic life. **Cerebrality** also constitutes the site of imminent failure of **cognitive capitalism**. A wounded brain means a de-optimized cognitive laborer.

CIRCULATORY CAPITAL As Mark Blaug asserts in his contribution to *The New Palgrave Dictionary of Economics* (2008), the distinction between **circulatory capital** and fixed **capital** goes back to the writings of Adam Smith particularly his work, *A General Enquiry into the* **Nature** *and Causes of the Wealth of Nations* (1776).

Circulatory capital is the opposite of constant or "fixed **capital**, with fixed **capital**—as its name implies—being stored in the instruments of production like the assembly line in a car factory. Raw materials are a good example of circulatory **capital**. Early economists also included wage goods in the definition of circulatory **capital**. The distinction becomes a little muddled when one considers the decremental depreciation of fixed **capital** over time resulting from the use of the machinery it is connected with. In every production cycle a certain amount of wear and tear occurs and part of its value passes on and circulates in its product. Fixed value, therefore, is steadily decreasing as instruments are worn out. As long as they are operational, a certain amount of **capital**-value remains fixed in them, but a small part is distributed and it circulates as a component of the commodity supply. According to Blaug, this led David Ricardo, in his *Principles of* ***Political Economy*** *and Taxation* (1817), to suggest that, first of all, the distinction between fixed and **circulatory capital** was relative to the industry in which the comparison was being made, and that it was really not a question of their absolute durability, but, rather, their durability relative to the production period in which they were used. Marx rejected this distinction instead using the terms "constant" and "variable" **capital**.

In **cognitive capitalism**, the mind and brain are the new factories of the 21st century, fixed and **circulatory capital** are developmental and ontogenic. The body, which formed the essence of industrialized living labor from the 18th to the 20th century, has been today substituted by the brain as the preeminent site of living labor. The neural machinery is a living organic form under constant change as a result of the unfolding of its genetic code; its epigenetic relationship to its genome masking and unmasking portions of the DNA—not to mention various mutations of its nucleotide backbone. One must also appreciate the intimate living relationship it shares

with the environment that caresses its labile neural plastic elements throughout life, consisting of both the sprouting and **apoptosis** or death of its neural appendages such as populations of **dendrites**. Importantly, the distinction between fixed **capital** and circulatory **capital**, so pertinent in the age of industrial capitalism, are becoming fuzzy in our new economy in which machines can fix themselves, and production cycles, such as the creation of mp3s for online music distribution, or producing and sending digital images, which do not characteristically depreciate. In **cognitive capitalism** the relation between dead and living labor concerns those neural functions outsourced to externalized technologies existing as apps on a smartphone. Here the capacities of living labor have been outsourced to physical digital machines that, with use, undergo wear and tear just like any other machine. We don't know the effects of overworking neural circuits of the brain during complex cognitive labor. As of yet we cannot state with certainty the relation between dead and living labor in the physical machinic brain. Indirectly we do know that **cognitive capitalism** comes with its own set of unique psychopathologies and that stress can effect **memory** which could imply a certain amount of **circulatory capital** being expressed with work.

CLASS CONSCIOUSNESS The **cognitariat**'s **class consciousness** is determined by a contemporary set of specific relations that characterize their unique form of laboring in the new economy, especially on the World Wide Web. **Algorithms**, like software agents, construct the **cognitariat** as a subject class through the production of such entities as Google search bubbles, which substitute for the natural environment in creating a population of virtual self images. True and false **class consciousness** are joined by "virtual **class consciousness**." The **cognitariat**'s relationship to history shares commonalities with

both the **proletariat** and the bourgeoisie. The **cognitariat**, as a cognitive laborer performing **immaterial labor** managed by the bourgeoisie, is the heir apparent to the **proletariat**, and, like their predecessors, they do not own the virtual means of production, the Internet, or the companies that produce the mechanisms of interacting with it. Their only means of subsistence, as in the case of the **proletariat**, is to sell their labor power for a wage or salary: although much of the labor of the present day **cognitariat**, like searching the web and producing emojis does not receive compensation and is done for free.) As Georg Lukács, referring to Marx, states, in his book entitled *History and* ***Class Consciousness*** (1923), the **proletariat** must not be simply a class formed as a result of this antagonism to capitalism, but, also, for itself; that is to say, their class struggle must be raised from the level of economic necessity to that of intentionally producing an effective **class consciousness**. In the knowledge economy, however, solidarity is a limited resource. Given the isolation, **precarity** and competitive quality of labor today, is it possible for the modern-day worker to attain true **class consciousness**? Will he or she ever attain the rights that their special position affords and come to understand history as a period specific, plastic and mutable condition and furthermore, that capitalism is just one chapter among many that characterizes history's unfolding?

CLICKBAIT **Clickbait** refers to dramatic, emotionally charged—and often untrue or unverified—web content designed to attract attention and prompt the of clicking a link. It is related to a phenomenon called the "tabloidization" of the news, as well as "infotainment." Typically used as a tactic to drive advertising revenue, its sensationalist principles have been adapted to disseminate political disinformation. In an article entitled, "**Clickbait** Scoops and an Engaged '**Alt-Right**': Everything to Know about

Breitbart News" (2016), Jason Wilson, writing in *The Guardian*, accuses Stephen Bannon and Breitbart News Network of engineering news content around the tactic of attracting clicks. **Clickbait** is an **apparatus** to direct selective attention in what has been referred to as the "**attention economy**" with the aim of directing the viewer to specific Internet content for as long as possible. Selective attention is, according to Elif Isbell et al. in "Neuroplasticity of Selective Attention: Research Foundations and Preliminary Evidence for a **Gene** by Intervention Interaction" (2017), the "ability to select and preferentially process specific information in the environment while simultaneously suppressing the processing of irrelevant, competing distractors." Furthermore, the same authors have connected, in different circumstances, the role of attention in eliciting changes in the **neural plasticity** of the brain especially inside the serotonergic system. The role of **neural plasticity** in adults as well as children has been adequately established, and, as **clickbait** engages the attentional system, it would appear that **clickbait**, in the form of **fake news** and false advertising, may have ramifications beyond its role in skewing the experience of the world, including playing a role in forming the neural network architecture of the brain, especially in the frontal and parietal cortices.

COGNIT A cognit, as described by Joaquim M. Fuster in his book, *Cortex and Mind* (2005), refers to the basic structure of the cortical network and **memory**. Cognits, as these basic units are called, are dispersed, overlapping and interactive neuronal assemblies or networks associated synaptically by life experience. By their very **nature**, they reject models of the brain's organization that delineate and define it as modular; specific areas of the brain are not activity specific, but rather distributed, and, according to J. A. Scott Kelso, in his book,

Dynamic Patterns (1995), behave non-linearly far from equilibrium. As such, the **cognit** is used to express the cerebral cortical representation of knowledge consisting of associated elementary representations of perception and action that have been linked through learning and past experience, and which manifest as assemblies of **neurons** and the connections between them. Cognits are dynamic structures that vary in size and any **cognit** can join others to form cognits of greater magnitude and **complexity**. Small cognits can be nestled inside larger ones and can be organized according to hierarchical principles, like the system found in the visual cortex, or are assembled as parallel principles such as in the frontal cortex. As Fuster notes in the above reference, perceptual cognits, those acquired through the senses like the **memory** of a great catch of an outfielder in a baseball game, are distributed in the posterior part, or caudal, **cerebral cortex**; while the rules of the baseball game, termed "executive cognits," are stored in the frontal cortex. Together, they form perceptual-executive (sensory-motor) cognits, which span both cortices linked by long nerve fibers.

I want to suggest that cognits are not limited just to the brain, but, on occasion, can be linked through epigenetic mechanisms to the socio**cultural** habitus. When Fuster in "The Cognit: A Network Model of Cortical Representation" (2006), addresses phyletic **memory**, or **memory** of the species, found in the primary cortices; he draws attention to the cumulative adaptive experience with the world that produced it. Furthermore, every time we experience a similar percept or action in the world around us we retrieve such a **memory** along with it.

To summarize, then, all cognitive networks have their base of origin in primary sensory and motor cortices In the **cerebral cortex** and other areas of the brain, **memory** is a result of excitatory associative

synaptic modulation caused by temporally-linked synchronous stimuli, as was first described by the Canadian neurophysiologist D. O. Hebb. These linked and simultaneous inputs can be a result of natural occurrences, or can be designed as part of institutional space/times with purpose of producing memories, and, as such, they are political in **nature**. As these stimuli are linked, and, thereby, associated, any of the original inciting stimuli can elicit the produced **memory** which can now be considered as a network of **memory**. Such stimuli can be consciously or unconsciously perceived. **Memory** also has a hierarchical organization which, as noted, commences in the primary cortices but then expands according to three anatomical and developmental gradients: phylogeny, ontogeny, and cortico-cortical connectivity. According to such gradients, some of these originary memories become assembled into divergent or complex arrangements, characteristic of analytic and discriminative cognits, while others converge into more abstract manifestations consistent with semantic cognits.

In **cognitive capitalism**, it is the **cognit** that links the originary experiences of the politicized distribution of the sensible to internalized representation as sensory-motor cognits, which then become assembled as abstract and complex cognits to build the neural architecture of the **connectome**. This is key to a view of cognits as extended and embodied, and as entities, which are capable of reaching across the cranial divide to engage in a world of things, relations, and social-communicative structures.

Gilles Deleuze's remarks in the preface to *Cinema 2: The Time Image* (1985) are pertinent here. In speaking about the break that led from the "movement image" to the "time image," was the result of the collapse of the "sensory-motor schema which constituted the action-image of the old cinema" or classic cinema. As a result of a loosening of the sensory-motor linkage, time ceases to be derived from movement appearing as itself in a pure state, giving rise to "false movements." Images, as such, are no longer linked by rational cuts and continuity, but, rather, false continuity and irrationality. Then what of the cognits that embody these new relations of experimental cinema? As with experimental cinema, what about other forms of experimental artistic practices like Situationism, Dada, Lettrism, or discursive practices such as Feminism and Decolonialism? Might they, through their idiosyncratic practices and readings, transform the **gestalts** and affordances of the real, imaginary, and virtual socio-political landscapes, and transform the millions of cognits that form the **connectome** in ways that emancipate the material brain from subsuming effects and disciplinary landscapes designed by institutional regimes?

COGNITARIAT The **cognitariat** is the 21st century version of the **proletariat**, workers who have exchanged physical labor on an assembly line (collectivity) for mental labor on computer interfaces (connectivity), such as booking.com and the Google search engine.

Its resonance with the word cognit, as used above to mean the basic structure of the cortical network and **memory** produced by life experience, implies a subject production in **cognitive capitalism** resulting from **cognit** association and assemblage. This becomes even more true in **Late Cognitive Capitalism** in which the material brain and its neural plastic potential are the new focus of capitalization. However it is Franco Berardi who is usually credited with coining this word in his essay, "What Does **Cognitariat** Mean" (2005). He understands the **cognitariat** as defined by, first, the kind of mental labor performed, for instance data production resulting from Google searches, and

secondly new labors' effect on the psychic life and desiring disposition:

> But the social existence of cognitive workers cannot be reduced to intelligence: in their existential concreteness, the cognitarians are also body, in other words nerves that stiffen in the constant strain of attention, eyes that get tired staring at a screen.

Unlike the **proletariat** laborer of **Fordism**, whose working style was managed by **Taylorism** to improve **surplus value**, the cognitiariat's mental labor in **cognitive capitalism** is managed by **Hebbianism**, **consumer neuroscience**, and neuro-technologies. Unlike the **proletariat**, whose work was often pure drudgery, the **cognitariat**'s life-meaning is wrapped up in work at the expense of life's other enjoyments, for example, sex. In fact, this de-eroticization of life has led to a reinvestment of desire in work. Byung-Chul Han in his book ***Psychopolitics****: Neoliberalism and New Technologies of Power* (2017) states that "Today, everyone is an auto-exploiting laborer in his or her own enterprise. People are now master and slave in one." (page 5) Furthermore, "The neoliberal regime transforms allo-exploitation into auto-exploitation: this process affects all 'classes'".(page 6)

I would like to suggest that the term **cognitariat**, as it relates to the cognitive laborer, may also find its meaning in the management directed at its root syllable, the cognit. That is to say that the **cognitariat**'s basic neural material unit, the **cognit** network, is what is being optimized, normalized, and ergonomically governmentalized. The **cognit** is part of a dynamic, extended network condition that links inside and outside—what are referred to as "engrams" and "exograms"—into a complex assemblage in which desire has been delinked. This is the root cause of what Berardi says is the **cognitariat**'s narcissistic reaffirmation, with attendant depression and anxiety.

COGNITIVE ACTIVISM **Cognitive activism** emphasizes, first and foremost, that certain doctrines, apparatuses, and means of achieving political goals—including street demonstrations, political pricing and refusal to work—were responses to labor practices and conditions associated with late 19th and early 20th century industrial capitalism, such as repetition, boredom, low pay, and poor working conditions. Post-industrial capitalism creates a different series of stresses within labor. Paolo Virno, in *A Grammar of the* ***Multitude*** (2001), understands work now as predominately performative and immaterial, taking place on computer terminals, generating and forming **affect** and emotions and leaving no objective, physical trace. This does not mean to imply that workers don't suffer in their bodies. The workers' role in the shift from industrial capitalism to **cognitive capitalism** does not relinquish the body totally but rather refocuses the circuits of its **embodiment** according to an alternative logic.

Early cognitive labor is characterized by **precarity**, **real subsumption**, the substitution of software for lower-end and less-skilled jobs, work-replacement technology, fragmented worker scripts, exacerbated income inequality, and code-generated **surplus value**.

As Franco "Bifo" Berardi suggests in The *Soul at Work* (2009), these conditions of work and competition have psychic consequences for the cognitive laborer, or **cognitariat**, and are partially responsible for various psychic pathologies like depression and attention deficit disorder. **Cognitive activism** is a call to: 1. Create a new vocabulary with which to describe the new conditions of **cognitive capitalism**. 2. Elaborate new circuits of performativity and action to combat its psychic distress. 3. Use research emanating from neuroscience, which

undergoes a process of deterritorialization in order to become a tool to combat the immanent subsumption of mental labor by **neural capitalism**. Strategies include, but are not limited to, hacking, whistleblowing, cryptography, use of the dark web, artistic and poetic acts which estrange the sensible/insensible distributions, yoga meditation practices, as well as the use of **ayahuasca** and other psychedelics. In addition, as Virno states again, creative, collaborative, Internet-based work, including peer production using open source software, revives communism's promise of non-alienated work. Today we know that this promise has not been fulfilled and new forms of **alienation** have popped up as everyone realizes in our moment of **fake news** or Cambridge Analytics. These procedures provide platforms for new forms of thinking that are collective rather than individualized. They necessitate shared thoughts and estrange habits of neoliberal perception.

COGNITIVE CAPITALISM **Cognitive Capitalism**, according to Yann Moulier-Boutang in his book ***Cognitive Capitalism*** (2004), follows two other forms of capitalism: mercantile and industrial. **Cognitive Capitalism** identifies the material brain and the mind as the new factories of the 21st century, and as the site of collective cognitive labor power. According to Moulier-Boutang, it emerges around 1975 and marks the moment when industrial **capital** gives way to this third type of capitalism, delineated by information and semiotics:

> We call this mutating capitalism—which now has to deal with a new composition of dependent labour (mostly waged)—'**cognitive capitalism**' because it has to deal with collective cognitive labor power, living labor, and no longer simply with muscle-power consumed by machines driven by fossil fuel energy.

Today, **cognitive capitalism** can be separated into two distinct periods, an early and late phase.

The early phase is defined by the following characteristics: **precarity**, **valorization**, **financialization** of **capital**, **immaterial labor**, **real subsumption**, and **communicative capitalism**. Andrea Fumagalli and Stefano Lucarelli in their article, "**Valorization** and **Financialization** in Cognitive Biocapitalism" (2011), would rather call this emergent economic form "cognitive biocapitalism"; they posit it results from the shift in the social relations of **capital** from a relationship between the labor force and the machine to one characterized by a relationship between "the mind, brain, heart unfolding itself within the human beings." Key to this change is the role of the human being in relation to **capital**. In **Fordism**, and **post-Fordism**, **capital** becomes human; whereas in cognitive biocapitalism, the multiple singularities and differences characterizing human beings are regulated by complex sets of roving **algorithms**—such as software agents—which construct data profiles and create additional **capital** therefrom.

Late cognitive capitalism—also known as the "cognitive turn" in **cognitive capitalism**—commenced around the turn of this century. In a world in which the predominant forms of labor are intellectual and service-oriented, the machinery of the brain takes on added importance as a locus of capitalistic adventurism and speculation. Various interdisciplinary approaches have been engaged to understand its logic, including cognitive neuroscience, behavioral economics, and **epigenetics**. As I describe in my book, *The **Psychopathologies of Cognitive Capitalism**, Part 1* (2013), **late cognitive capitalism** is defined by three conditions. First, **biopower** is supplanted by **neuropower**, in which populations of brains and the nervous systems to which they are connected are the new focus of sovereignty and governmentalization. (The

term "brain," as described here, is understood as an entity existing inside and outside the skull and includes not only its intracranial substance, but its extensions into the body, especially its somatic and autonomic nervous system, as well as the evolving external semiotic, social and **cultural** relations to which it is tethered.) This is well illustrated in Andy Clark's notion of natural-born **cyborgs** as recounted in Michael Wheeler's essay "Thinking Beyond the Brain":. *"It is of our very **nature** as evolved and embodied cognitive creatures to create tools which support and enhance our raw and organic intelligence by dovetailing with our brains and bodies to form shifting human-artifact coalitions operating over various time scales"* (Wheeler 2011). Key to this statement is that many of these artifacts are discursive ensembles and tools to reconsider our accelerating world. Ensembles as of late that are embracing post-Humanist and Post-Anthropocentric ideas. Secondly, Taylorist managerialism is replaced by **Hebbianism**. Instead of the body's movements, especially those utilized during physical labor, being the focus of scientific research, with its desire to improve **surplus value**, the new focus of this research is the optimization of the efficiencies of networks in the material brain with those of the new computational apparatuses with which it is linked. Here, **surplus value** concerns augmenting, intensifying, and enhancing cognitive laboring on the networks of virtual platforms in the process of searching information, crowdsourcing, or prosuming. The synchrony and resonance between the co-evolving processes of the ontogeny of techniques and their neural correlates is essential here. Thirdly, the attributes of the prefrontal cortex such as prognostication, adapting to both uncertain and precarious situations, and **working memory** become increasingly essential to the cognitive laborer.

COGNITIVE MAPPING **Cognitive mapping** is a term drawn from Kevin Lynch's book, *The Image of the City* (1960), where it is used to refer to the mental maps of urban space formed by each of a city's citizens. As such, it is related to the "mind's eye" and **working memory**. One particular quality extremely important for Lynch is the apparent clarity or legibility of the cityscape, and the mental image it elicits from the tender entanglement of **memory** and online experience. When elements of this mental image are shared by many inhabitants of the city, perpetrated as they are, by so-called "common areas of agreement" in existentially lived collective experiences, "public images" emerge. At the very heart of this optimized and phatic experience there still emerges the conditions for obscurity, **noise**, mystification, and surprise. According to the authors, we may enjoy a house of mirrors or a crooked street, but we don't appreciate total chaos. In *Postmodernism, or, the **Cultural** Logic of Late Capitalism* (1991), Fredric Jameson expands this term to include the unrepresentable imaginary social and global totality of postmodernism. He argues that the ability to map the entirety of its complex global and social conditions is beyond the capacity of our understanding, creating what he refers to as the "**hysterical sublime**."

COLLAGE **Collage**, from the French "to glue," is a trans-disciplinary term used to describe the process through which diverse materials of various dimensions are glued or secured together on a surface. It is related to photomontage and *assemblage*, and is connected to chance. **Collage**, especially in the hands of Dadaist artists, became a way to critique the rational discourses they believed precipitated the destruction brought about by the First World War. In response, they turned to non-rational techniques that depended on chance, action, and **improvisation**. The Dadaists used images found in

newspapers and magazines to create personal statements of protest against their overly rationalized world and the prerogatives of the bourgeoisie, which they felt the newspapers and mass-circulation periodicals of their time represented. Of particular importance was their use of words in unusual, abstract arrangements that disrupted the conventional rules of grammar and punctuation, as well as the use of puns. Dada works and publications often barrage the viewer with a plethora of wordplay and jokes.

Two contemporary forms of **collage** are also worth mentioning in which chance plays a large role. The first, emerging from the Dadaist practice of Tristan Tzara, is called *cut-up.* Here a full linear text is cut up into pieces and then these are gathered and rearranged into a new text or poem. The second is called Fold-in and was developed as a joint venture by Brion Gysin and William Burroughs. As its name implies it is a folding process in which two pieces of paper with linearly arranged texts are folded vertically and combined. The reader then reads across the two texts and interprets whatever meaning has occurred by chance. Gysin rediscovered the technique while cutting papers with a razor blade on top of protective layered newspapers. Art production is not only attaining a result that is preformulated but sometimes occurs through recognizing the importance of an accident. Such is the case in this instance. Gysin realized the importance of this accident and transformed it into a conscious technique that he used deliberately in the end creating the book *Minutes to Go* from a series of works he had created. He showed the book to Burroughs who also realized its importance as a means of exposing the implicit content of a text. Together they published *The Third Mind* a collection of cut-up writing essays and writings on the subject.

COMMODITY FETISHISM According to Steven Shaviro, in his essay, "**Commodity Fetishism**" (2005), **commodity fetishism**—also known as "commodity animism"—is the imbuing of a commodity with a soul. As Marx had theorized in ***Capital*** (Volume 1, Part 1, chapter 4 on the fetishism of commodities), commodities participate in the way we live; they function, in this understanding, as magical beings with reproductive powers that animate material things with an inner life. **Commodity fetishism** describes and characterizes objects in **Fordism**, and is later joined by language-dominated symbolic fetishism, especially in **post-Fordism** and **communicative capitalism**. In **early cognitive capitalism**, symbolic fetishism is still important. **Immaterial labor**, defined as performative labor that no longer leaves a trace, becomes more and more predominant. Labor is no longer restricted to the production of objects in real-time, but feelings and emotions as well, and it concerns the way language as a symbolic specter inhabits and colonizes the thoughts of the **cognitariat** (whose cognit-generated mental energy continues the process of production in the feed-forward and feedback relations of the network). This, then, is the true definition of **valorization**, in which the fixed **capital** of the machine age is replaced by the neural synaptic logics of the network, and **circulatory capital** is distributed throughout the **social factory** where it becomes fractalized. Thus symbolic fetishism first accompanies and then mutates into imaginary fetishism and the spirit of the economy engages with those salient images that form the narratology of **the mind's eye** building the story that appears therein. The stage of **the mind's eye**, upon which scenario visualizations are reenacted, is a key component of **neuropower** in late-stage **cognitive capitalism**. First to the degree to which memories are stored and thus deemed important and then how they are combined to create the

situation in the image of thought. Is the story provoked there linear or non-linear, fanciful or real or narrative or non-narrative. It also refers to a future dispositive rooted in the notion of the **singularity** when supposedly dynamic neural potentials will become linked up to the **Internet of Things** to become a node in the **Internet-of-Everything (IoE)**. I call this future disposition, **neural subsumption**, which replaces **real subsumption**. In the future every thought will constitute the potential for labor, whether conscious or unconscious, and, as such, will be monitored, surveilled, and commoditized as metadata and data.

THE COMMONS In their book, *Commonwealth* (2009), Michael Hardt and Antonio Negri describe the shifting kaleidoscopic image of **the commons** as a transformative process. It is delineated by three concepts. First, it designates the "common wealth" of the material world: its air, water, and natural ecosystems, all of which are shared. Second, it consists of the social constructions necessary for social interaction, such as knowledge and language. Citing the struggles of the Bolivian **multitude**, they draw attention of this second form of **the commons** as a ready-made and accessible structure that formed directly out of "already existing networks and well-established practices of self-government," ready to be applied and adapted. Implicit in this formulation is a third idea that humans must take care of the environment and cohabit with other beings in **nature** in a common world. In recent decades, neoliberal governments have tried to privatize **the commons** for various reasons. Some of these reasons were profit-focused while others were ostensibly to prevent the "tragedy of **the commons**." This notion suggests that people left to their own devices destroy **the commons** (for instance shepherds who let their animals overgraze, and who, therefore, need public or private supervision).

The **neural commons** is a subset of **the commons** and describes those linked and tethered conditions and processes of the intracranial material brain, such as the activity of its hardware, produced by **neurons**, neural networks, and glial cells of the gray matter, as well its software—those cellular processes generated by its white matter responsible for the initiation of brain oscillations which account for information processing and long range neural communication. **Binding**, attention, temporal processing, and top-down salience are dependent on neural synchrony and phase coherence. Both hardware and software are essential components of **neural plasticity**.

Recently, the **neural commons** has become the site of capitalist commodification and subjugation under the guise of medical and psychiatric treatments as well as the project of neural enhancement. Experimental technologies and "technoceuticals" like **brain-computer-interfaces**, **optogenetics**, **neural dust** and cortical implants, just to name a few, add to the already long list of active pharmacologic agents used to treat diseases of the brain. These, and more invasive technologies, sponsored by the Defense Advanced Research Projects **Agency** (DARPA) like Neural Input–Output Bus, or "NIOB," and "brainnet" have led James Giordano, a neural ethicist at Georgetown University, in his book *Neurotechnology in National Security and Defense* (2015), to state that "the brain is the next battle space."

It is worth noting that in the future direct linkages between the **neural commons** inside the brain and outside will be possible. Assemblages of many tiny smart MEMS, tiny micro-electromechanical systems made up of sensors, robots and other devices, detect temperature, vibration and magnetism in a circumscribed area and transmit them to a linked system of devices in the brain made up of what is referred to **neural dust**. **Neural dust** refers to implantable

piezo-electric crystals that are 3 mm in length, 1 mm in height and 80 mm in width. So far they are only used in the peripheral nervous system but as they become smaller in the range of 100 microns the possibility of implantation in brain tissue might be possible. Smart dust and neural dust complexes could link the **neural commons** to the exterior commons.

COMMUNICATIVE CAPITALISM I view **communicative capitalism**, the result of networked communicative technologies, similarly to Michael Hardt and Antonio Negri in their book, ***Empire*** (2000), as a form of capitalism in which society has been totally subsumed by its regime at all levels, making it a global phenomenon. Jodi Dean, in her "**Communicative Capitalism**: Circulation and the Foreclosure of Politics" (2009), disagrees with an essential component of Hardt and Negri's argument for centering, as it does, around **communicative capitalism**'s emancipatory capacity. She understands that these new technologies, rather than providing an opportunity for the formation of counter-hegemonies, and a chance for democratic governance, often do just the opposite. They are, in fact, tremendously depoliticizing. Her work poses the following question: how has meaning and communication changed as a result of the way they operate and flow in mediated global capitalist technoculture? Fundamental to her "post-political argument" is the way politics no longer expresses an inside or outside, foreclosing disagreement, and, thus, politics itself. Borrowing an idea from Giorgio Agamben, she suggests that language has lost its ability to communicate politically in its transition to "exchange value." In the new economy, language exchanges its message in favor of what she calls "pure circulation." The message is part of the data stream, and its actual content becomes more and more irrelevant as it is subsumed by its capacity for generating clicks

of a mouse, attention and unrestricted feed-forward circulatory **capital**. What is essential is its secondary (or meta) condition as the productive energizing force of the new economy. As information travels the distance from one node in the network to the next, and traverses the digital divide between the center and the edge of the network and back again, producing, as it does, data streams mirroring its journey as it temporarily connects, reconnects, and ricochets forward and backwards, the information generates value for its brokers, data collectors and analysts. As simple, fungible units of value, like money, we can no longer debate their meaning or use them as a political tool to effect change in society or law. Although written in 2005, her words ring true if we consider the power of Donald Trump's vapid and meaningless tweets to create media content with digital resonance and dissonance.

COMPLEXITY Herbert Simon, in his article published in 1962, "The Architecture of **Complexity**," recognized that an important quality of complex systems is that the whole is often more than the sum of its parts, and that understanding the actions and reactions of its parts may not allow one to infer the properties of the whole. Interactions between these components bind and integrate a large number and great variety of individual elements together.

According to Olaf Sporns, in *Networks of the Brain*, **complexity** refers to a system of organized relations designated by the term "functional coherence" which allows the system to transcend the intrinsic capacities of its individual components. Stating in this same volume "that the union or coexistence of segregation and integration expressed in the multiscale dynamics of brain networks is the origin of neural **complexity**." "Multiscale dynamics" refers to the way that local elements or components operate in parallel on several hierarchical levels simultaneously. **Complexity** mixes order and

disorder, regularity and randomness, together which accounts for the diverse dynamics and non-repeating **nature** of complex systems. High **complexity** in a neural system is attained if the system allows for a large number of differentiable states and, at the same time, achieves their functional integration. Gerald Edelman and Gioulio Tononi in *A Universe of Consciousness: How Matter Becomes Imagination* (2000), clarifies these ideas of neural **complexity**: "Thus, we reach the important conclusion that high values of **complexity** correspond to an optimal synthesis of functional specialization and functional integration within a system. This is clearly the case for systems like the brain –different areas and groups of **neurons** do different things (they are differentiated) at the same time they interact to give rise to a unified conscious scene and to unified behaviors (they are integrated). By contrast, systems whose individual elements are either not integrated (such as a gas) or not specialized (like a homogeneous crystal) will have minimal **complexity**."

Furthermore, key to the level of **complexity** in neural systems, according to Sporns, is the level of **complexity** in the environment, and, he writes, " Neural **complexity** confers an adaptive advantage because it enables a greater range of responses and a greater capacity for generating and integrating information about the external world as accessed through the senses." This is where the relation between politics and neuroscience becomes clear.

More complex environments nurture neural **complexity**, which nurtures richer mentation. After characterizing complex environments as consisting of both order and disorder Sporns writes, "repeated encounters with structured inputs reorganize intrinsic connections in a way that endogenously recapitulates salient stimulus features." Later, he elucidates the

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relation of the **complexity** of the brain and environment in the following way: functional brain networks are powerfully reconfigured as a result of sensory events in the real world that are the outcome of brain activity manifested as environmental change.

What these salient stimuli are, and the degree to which they are anthropogenic, is a culturally and politically weighted question and represents a key aspect of **neuropower** in **cognitive capitalism**. In conclusion, what is political is the degree of **complexity** of designed urban space and its effect on neural architecture. Complex and highly differentiated networks in the real, imaginary, and virtual world sculpt analogous complex and highly differentiated networks in the brain. These highly complex networks and their capacity to code a multiplicity of meanings through the connective relations constituted by them afford a more facile capacity for thought. A number of interesting research experiments add substance to these claims. In their article, "The influence of complex and threatening environments in early life on brain size and behavior," C. Depasquale et al. (2016), show that when zebra fish are reared in housing with significant structural **complexity** they exhibit larger brains than those that do not when scanned with magnetic resonance imaging or MRI. They also note that **environmental enrichment** affects behavior positively affecting spatial learning, increasing exploration and decreasing anxiety while at the same time enhancing neurogenesis. Another group of scientists at the University of Wisconsin-Madison and Michigan State University programming animated critters they call "animats" to play two different video games, The first group played a game similar to "Tetris" and another a more complex one. "At the end of 60,000 generations, they all had evolved more complex wiring in their neural networks, but the animats that did so in more complex versions

of the game had developed particularly intricate neural networks." According to lead author Larissa Albantakis, given the restricted number of **nodes**, what this implied was that more complex environments require the animats to develop more neural functions with more integration between the them.

CONCEPTUAL ART **Conceptual art** underwent a radical transformation in **post-Fordism**, which continues into **cognitive capitalism**. Its evolution has transitioned through three phases, from 1. The dematerialization of the art object as it was referred to by Lucy Lippard and its so-called negation and subsequent resistance to the burgeoning art market; 2. Its post-conceptual phase led by the curator-impresario, Seth Siegelaub, who learned how to make the uncollectable collectable through such devices as artist certificates; 3. An exploration of how **immaterial labor** does leave a trace after all as memories sculpted in the material brain.

For the purposes of this glossary, it will be helpful to describe these phases in further detail. The title of Harald Szeemann's 1969 exhibition at the Kunsthalle Bern, *When Attitudes Become Form*, and its subtitles, *Works-Concepts-Processes-Situations-Information*, and *Live in Your Head,* clearly express **conceptual art**'s complex heritage and its emphasis on information, processes, and ideas. Lucy R. Lippard and John Chandler reacted to the **zeitgeist**'s immanent ideological pressures on the object in their 1968 essay, "The Dematerialization of Art," suggesting that the object of art was undergoing a profound dematerialization and might eventually become obsolete. In his book, ***Conceptual Art*** (2002), Peter Osborne points to **conceptual art**'s provenance as a negation of Clement Greenberg's analysis of painting: its material objectivity, medium specificity, visuality, and **autonomy**. This negation was also a fundamental reaction to the burgeoning speculative art market of the mid-1960s, which solidified the commodification of the art object. This was turned on its head by the second phase of the history of conceptualism, commercial or "post-conceptual" art, which was led, according to Alexander Alberro, in his book, ***Conceptual Art*** *and the Politics of Publicity* (2003), by Siegelaub. Siegelaub devised methods—such as creating certificates of authenticity—to make otherwise intangible or "uncollectable" works, collectable. Along with many artists in the 1980s, he led the march against modernism's dream of art as a means of resistance, uncovering instead, an antipathy to theory and an inevitable entanglement with market forces. Siegelaub's understanding of the rudimentary politics of art in the age of **communicative capitalism** was a realization that immaterial art was not about immaterial objects. It was, rather, about **immaterial labor**. Today, artists like Tino Sehgal carry on this tradition. In the third phase of **conceptual art**, these immaterial relations have been found to be not so immaterial. Performative and virtuosic performances do, indeed, leave a trace in the material brain as traces scripted and etched into the logics of neural networks that produce distributed forms of thought. In late-stage **cognitive capitalism**, long-term memories are called up into the theater of **the mind's eye** where they are reenacted into "scripted" scenarios. Late-stage **conceptual art** thus echoes its first emancipatory stage, but instead of acting upon the existential world of objects as sites of political action, acts through modifying the neural-plastic brain and the cornucopia of representative memories that are its outcome.

CONNECTIONISM A classic reproach to 'good old-fashioned **artificial intelligence**' (GOFAI) is that it left out any aspect of embodiment, in its focus on symbolic reasoning, but also, any dimension of 'learning' characteristic of biological brains and which, it turned out,

neural networks were good at emulating. In the 1990s, the availability of new imaging techniques in cognitive science initiated a turn towards actual, biological brains, away from the computer metaphor and the ensuing computational functionalism (which was propounded notably by Jerry Fodor and Zenon Pylyshyn). **Connectionism** (also known as parallel distributed processing) seeks to model and explain cognitive abilities using **artificial neural networks**, which are simulations of real neural structures. The connectionist view seeks to move away from the computational focus on information, symbols and representations (information is represented by strings of symbols that have been produced by an instructional program). **Connectionism**, on the other hand, understands information as stored and represented non-symbolically: it is a sum of weights or connection strengths between the units that make up the layers of an artificial neural network. Implemental connectionists, in a sense, are not directly opposed to computational functionalism, but instead, accommodate both paradigms: the mind is represented both as a neural net and as a symbolic processor.

CONSUMER NEUROSCIENCE OR NEUROCONSUMERISM

Consumer neuroscience is a branch (and further elaboration) of marketing in which neuroscientific methods are applied to strategies of consumer engagement ostensibly because they provide insights unavailable using traditional market behavior models.

This form of marketing aids in unveiling implicit or unconscious processes that exist beyond a subject's capability to verbalize and correctly recall certain states of mind. Such areas are therefore difficult to access using existing behavior-centric methodologies.

Consumer neuroscience allows researchers to identify the neural processes behind these unconscious forms of awareness, through such methods as fMRI and EEG as well as—in rare cases—single cell recordings that purportedly determine a subject's responses at the neurobiological level. In their introduction to the *Journal of Marketing Research*'s special issue on neuroscience and marketing, Colin Camerer and Carolyn Yoon summarize the results of an experiment using a special combination of machine learning and fMRI:

> [A]uthors report evidence that brand personality traits exist a priori in the minds of consumers; as a result, the brands a consumer is thinking about can be reliably predicted from patterns of neural activations.

Consumer neuroscience also offers an opportunity to reveal the tremendous **variation** of consumer behavior as a result of structural differences occurring within individual brains. Again, turning to the summary of Camerer and Yoon, they discuss the 2015 work of Plassman and Weber which illustrates this phenomenon:

> individual differences in gray matter volume in brain areas associated with personality traits moderate the extent to which consumers respond to marketing-based expectancy effects (e.g., price).

Perhaps most importantly, **consumer neuroscience**'s capacity for incorporating neural data for predicting the market behavior of consumers is of particular interest to corporate entities. Camerer and Yoon present the work of Telpaz et al. (2015) to illustrate this aspect of the application of **consumer neuroscience**:

> changes in amplitude of the N200 component and in theta band power during passive

viewing of consumer products reliably predict future choices of consumer products.

According to Manuel Garcia-Garcia and his co-authors in their book ***Consumer Neuroscience*** research of special importance to **consumer neuroscience** concerns the brain's reward system, which it seeks to use to activate a dopamine circuit including the ventral tegmental area of the midbrain, the amygdala (an important site in the production of emotional responses and the capacity to perceive emotions in others), and the prefrontal cortex. The release of dopamine is associated with a positive description by the consumer of an object, a behavior, or a pleasurable internal physical state. In his article "Biological and Psychological Reasons for Social Media Addiction" (2017), Suren Ramasubbu draws the connection between social media addiction and dopamine. "The release of dopamine during online social networking makes it much harder for people to resist the activity. "

Consumer neuroscience is also concerned with attention. By using data and other results from research on the **memory** faculties and attention of consumers, neuroscientists can aid marketers in predicting more accurately future consumer behavior, as well as in producing a more optimized **cognitariat**.

CONNECTOME The **connectome** is the data set describing the connection matrix of the nervous system. It represents the network of anatomical connections linking neural elements. The ***Connectome*** *Project* is a research project occurring worldwide which attempts to map this **connectome** in the hope of providing a unified, time-invariant neuroinformatic resource for comparisons with brains that have suffered, for instance, traumatic injury or debilitating disease.

It represents the network of anatomical connections linking neural elements, and is now used by neuroscientists to represent the material brain. It supplants the modular brain model in which each part of the brain subserved a different function with one that is distributed and networked. The **connectome** also refers to the assemblage of populations of social brains, as they reach beyond the limits of their cranial divide to share a **theory of mind**s and articulate herd behaviors in a valorized and financialized economy.

Connectomics is the production and study of **connectomes**.

CONTINGENCY In the words of Robin Mackay in the Introduction to his "Three Figures of **Contingency**," "**contingency**' refers to the attempt to think events that take place but need not take place, events that could be, or could have been, otherwise" (McKay, 2011). Furthermore, it is "that which thinking can grasp as event, not as proceeding from a rational necessity." It spells the ruin of dogmatic accounts that attempt to bind all principles, whether they be past, present, or future, into a comprehensive narrative that is already known from the moment the first characters are introduced. It is a result of insipid platforms of normalization that have endo-colonized the collective intelligence. **Contingency** is a wellspring of hope for the possibility of **estrangement** and withdrawal. As Quentin Meillassoux states in *After Infinitude*: "The contingent… is something that finally happens—something other, something which, in its irreducibility to all pre-registered possibilities, puts an end to the vanity of a game wherein everything, even the improbable, is predictable" (Meillassoux, 2006). How this **contingency** will stand up to the overwhelming effects of **Big Data** and the **Big Other** is anyone's guess. On another front, Reza Negarestani in his essay "**Contingency** and Complicity" defines the

artwork in terms of the **contingency** of its materiality as it can become the basis for new interactions and dynamic processes that drive the artist to novel realizations and opens up the potential of the work not assumed at its inception. It might also have the opposite effect; closing down the progress of the work even to the point of its immobilization. He states that **contingency** "is the simultaneous suspense of infinite likelihoods and inexplicable frozenness."

CORPUS CALLOSUM The **corpus callosum** is the principal nerve fiber bundle in the brain and is made up of 200-250 million axons that connect the two hemispheres of the brain, its so-called "left and right hemispheres." It is a feature of placental mammals and appears rather suddenly in the evolutionary record. It is important for the inter-hemispheric transfer of information between the two hemispheres and may be important for **binding** mechanisms by allowing for the bilateral transfer of synchronous oscillations during bimanual coordination, allowing the brain to act as unified whole. In order to study the two hemispheres of the brain, Roger Sperry cut the **corpus callosum** to create what was referred to as the "split-brain." Human patients, undergoing a similar procedure for intractable epilepsy, were tested in his laboratory, where, utilizing a clever experimental design involving a tachistoscopic projection to selected visual fields, he was able to tease out significant differences of the function and processing of the two different hemispheres. The left hemisphere of the brain is referred to as the dominant hemisphere because in 90 percent of people, the language centers are located there. It is also dominant for mathematical and logical abilities, whereas the right hemisphere is dominant for spatial tasks, face recognition, and music.

CORTICAL REMAPPING **Cortical remapping**, also called "cortical reorganization," describes a reaction of the brain after the amputation of an arm, leg, or digit. This process is called "deafferentation" because nervous stimulation is no longer exciting the part of the brain which normally processes that specific input. Remapping is a reaction to this deafferentation, which is made possible as a result of the brain's **neural plasticity**. Remapping is a phenomenon found to occur both in the primary somatosensory or and motor cortex, located in the pre and post-central gyri of the brain (although it is generally agreed that is more important in the somatosensory cortex). First identified by Michael M. Merzenich as occurring in somatosensory map representations of amputated digits in owl monkeys, it has now been found in many other systems. In his article, "Somatosensory Cortical Map Changes Following Digit Amputation in Adult Monkeys" (1984), Merzenich describes how nerves emanating from amputated digits were first tied to prevent their regeneration. Over time, the surfaces of adjacent digits and palmar surfaces, as they were represented in the **cerebral cortex**, expanded their innervation fields to occupy the orphaned cortical territories. Later, Vilayanur S. Ramachandran, in his article, "Perceptual Correlates of Massive Cortical Reorganization" (1992), drew attention to a phenomenon occurring after longtime deafferentation, or loss of sensory input from the arm. It was found in patients suffering from upper limb amputation, that light touches to the lower face caused a sensation felt in the phantom limb. Cortical areas corresponding to the face are adjacent to areas corresponding to the limb in the primary somatosensory cortex. Like in Merzenich's experiments, the area of facial representation migrated over and subsumed the now-orphaned area of the limb. This process, called "remapping," can serve as a poignant metaphor

for the Situationist process of ***détournement*** and the philosophical concepts of deterritorialization and reterritorialization.

Remapping is a phenomena that follows amputation of a limb and is associated with the phantom limb phenomena. Because of the faulty wiring that results in the sensorimotor cortex as a consequence of the depleted input from the now absent limb, contiguous maps in that cortex, especially those of the face and hand or the hand and the remaining stump, which are still receiving inputs and thus are still very alive, slide over to take over the adjacent area with phantasmagorical results. For instance gently touching the face with a cotton swab in the area of the jaw can create a faulty sensation in the absent hand. In other words the now faulty rewiring transfers messages that are no longer real in a conventional sense.

COSMOPOLITANISM **Cosmopolitanism** is a term with roots in Greek Stoicism. The Stoics articulated four principles of **cosmopolitanism**, which are: 1. The rejection of an absolute limit to political belonging by incorporating all of humanity; 2. The assertion that human rights are not constrained by geopolitical boundaries; 3. The adoption of a nonhierarchical schema of **cultural** value; 4. The proposal that self-awareness is related to an exchange with the other. Immanuel Kant's concept of **cosmopolitanism**, as he stated in "Toward Perpetual Peace," (1795) referenced in The Stanford Encyclopaedia of Philosophy, centered on his idea of global peace, which he believed could be brought about through the process of deprovincializing the political imaginary and extending the notion of equal worth to all human beings. According to Nikos Papastergiadis, in his book, ***Cosmopolitanism*** *and Culture* (2012), Kant understood **cosmopolitanism** as the end stage of a historical process of passage beginning with the primitive, continuing through the feudal, and, finally, arriving at the nation state. The core of Kant's idea was that the universal and worldly perspective of **cosmopolitanism** was produced through political reason and rational deduction, rather than subjective feeling, love, and aesthetic experience. According to Kwame Anthony Appiah in his book, ***Cosmopolitanism****: Ethics in a World of Strangers (Issues of Our Time)* (2006), two strands are entangled in the concept of **cosmopolitanism**. The first of these is the idea that people are different and that we need to learn from those differences. The second is the notion that **cosmopolitanism** begins with the idea of a human community. We, thus, need to create habits of coexistence to live together harmoniously in our global culture.

CREATIVITY I draw attention to the rupture of the meaning of the term "**creativity**" described by Maurizio Lazzarato in the book *Experimental Politics, Work, Welfare, and* ***Creativity*** *in the Neoliberal Age* (2009) (edited by Jeremy Gilbert). There he draws upon the work and writing of Marcel Duchamp to critique what he considers to be an antiquated notion, the idea put forward by Jacques Rancière of the distribution of the sensible. Although Lazzarato finds this notion to be profound, he uses the model of Marcel Duchamp to escape from its dialectical **nature** and dependence on dualities that worked as a critique of industrial capitalism but which is no more relevant to the new socio-economic realities of **post-Fordism** and **cognitive capitalism**, what he calls our "post-disciplinary culture." Apportioned architectural footprints of disciplinary systems of governmentalization have been subsumed by those of the continuous gradients of the **society of control** in which subjectivity and the affective potential of the worker takes on additional importance. For Lazzarato, Duchamp's rejection of art

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as a professional, specialized activity and its replacement with the idea of art as a component of all human endeavors is key. With this foundational concept, he builds a new notion of what the divisions inherent in the concept of distribution of the sensible might look like, and how they might function in the new economy. Gone are the dualisms between ways of doing and ways of seeing which determine who has power to name the sayable, the thinkable, and the possible. Gone are the political consequences and forms of domination produced by the differences between people of refined culture versus those of simple **natures**, the leisure class over those who work, and the class of intellectuals over those doing manual labor. Following Duchamp's realization that the ready-made delinked the hand from art-making, and the power of art resided in the artist's ability to name and categorize, Lazzarato reformulates the idea of **creativity** as something shared by all people and not just a select few:

> Yet in our society today, there is but one population that engages in activities all of which contain 'coefficients' of **creativity**, speech, developed sensibilities, intellect, and refined culture—in other words, all that once constituted the exclusive 'heritage' of the bourgeoisie (or the aristocracy).

In his opinion what is more important than the unequal distribution of sensibility and its political consequences are the new requirements of neoliberalism for **autonomy** and the pressure to express and create that this entails.

CULTURAL I use the word "cultural," rather than "culture," to express a concept of difference as a contrastive rather than substantive property. I follow the arguments of Arjun Appadurai in his book, *Modernity at Large*: ***Cultural*** *Dimensions of Globalization* (1996), which delineates this mobilization of difference into two categories which he calls "Culture 1" and "Culture 2." Culture 1 is an open-ended **archive** of differences, constituted by ideas, customs, and social behavior that are consciously or unconsciously shaped into Culture 2, a subset of differences that comprise its distinguishing characteristics, which shape group identity.

CULTURAL ATTENTION **Cultural attention** acknowledges that attention is linked to **cultural** identity. Specific local and global cognitive, perceptual, and affective relations which are entwined in the social, political, economic, historical, spiritual, and technological *habitus*—through such devices as religion, custom, advertising, and branding—gain greater significance, and are, thus, paid attention to. **Cultural attention** is linked to the **attention economy** and the ideas of salience.

CULTURAL CAPITAL According to Pierre Bourdieu, **cultural capital** comes in three forms: embodied, objectified and institutional. One's accent is an example of an embodied form, the car one drives is a form of objectified **cultural capital**, and the credentials and degrees one attains represent institutional **cultural capital**. Like Marx, Bourdieu, too, believed that **capital** formed the basis of social life, although he emphasized its symbolic importance. Symbolic elements, like tastes and mannerism, which are reproduced by parents in aristocratic homes and learned by their children, are beneficial to later achievement in the classroom because these tastes form the core values of the school curriculum required by the state to be learned. **Cultural capital** is, therefore, linked to **cultural** reproduction.

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CULTURAL EVOLUTION **Cultural Evolution**, as described by Michael Tomasello in his book, *The **Cultural** Origins of Human Cognition* (1999), is the result of specialized human social, cognitive, and **cultural** learning skills based on innovation and mimesis or imitation. These processes, possibly supplemented by instruction and learning, take place in a dialectical process such that each step in the process forms the basis of the next and produces in its wake an ever-increasing chain of **complexity** and a wider-ranging adaptive network. This cumulative **cultural evolution** is called the "ratchet effect" and can be seen manifested in the fossil record of hammer-like tools which evolved from stone tools composed of a stone tied to a stick to that of the mechanical hammers of today, e.g. the jackhammers used in road building.

It is assumed that **cultural** and social conventions and rituals also evolve to be more complex over time to meet the evolving social and political realities expressed in the contemporary **cultural** and economic context of the information and knowledge economy. These accumulating **cultural** changes, and the residues they leave as **cultural memory**, also have epigenetic consequences, and lead to concomitant changes in the brain's neural architecture as a result of its sculpted neural plastic potential. **Cultural evolution** co-evolves with neural evolution, as a step beyond (but in the wake of) the so-called 'Baldwin effect', which describes ways in which non-biological traits such as linguistic and **cultural** behaviors can be assimilated in such a way as to be transmitted, or put the other way round, how learning can **affect** the direction and rate of evolution by natural selection (Depew & Weber eds. 2003). Baldwin, whose ideas regained some traction in the past decades, is one early thinker of **cultural evolution**; another is Henri Bergson, in his famous *Creative Evolution* (1907) and late work *Two Sources of Morality and Religion* (1932). For Bergson, humanity was prefigured in evolution all along. Human culture begins to evolve as it opens itself up to free individual development (in art, science, technology, etc.), which then improves the status of the group.

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CULTURAL MEMORY **Cultural memory** is linked to issues surrounding the process of archiving and **cultural** heritage. On the one hand, it is realized in each generation's artistic and architectural expressions inscribed and projected upon (and in) designed urban spaces, such as the style of buildings and their cladding, as well as commemorative plaques, statuary, frescoes, photographic billboards, the incessant temporal repetitions of commercialized neon signage, and video projections on architectural exteriors. **Cultural memory**, therefore, is linked to distributions of sensibility (and insensibility), as described by Jacques Rancière; an example of such insensibility includes the empty plazas left by urban renewal and what Rem Koolhaas refers to as "**Junkspace**" or what coagulates while modernization is in progress. Importantly, **cultural memory** is a trans-generational phenomenon in which the echoes of the past coexist (arranged linearly and/or distributed diffusely) side by side with those of the present. As residues of artistic experimentation, these material leftovers represent the histories of discussions and dissent that are broadly represented and acknowledged in the social-political-**cultural** field. Its traces combine to produce a material **archive** of sorts, in motion and always becoming. In the past three decades, the World Wide Web has become ever more important as a repository of **cultural memory**. Together, these different platforms and stacks have material consequences for the neural plastic brain (and mind) of each successive generation that experiences them.

CYBORG The definition of a **cyborg** is a hybrid of machine and organism. Early on in its genesis, its meaning became entangled with the notion of an augmented human being who could live in unnatural environments, the kind we might encounter in outer space during future interplanetary travel. Experiments in healing damaged sensory systems and extending the capacities of the nervous system began with the early work of William Dobelle who in 1978, placed brain implants into the subject, referred to as "Jerry," to improve his sight. Many such experiments followed, and, today, advanced **neural technologies** abound such as implantable and disengaged **brain-computer-interfaces**, EEG headsets, deep brain stimulation devices, cortical implants, **neural dust**, and **retina**L implants. Elon Musk, founder of Tesla Inc. has been outspoken for the need of humans to augment their intellectual capacities by becoming **cyborgs** with increased brain function if they are to continue to be relevant in a world dominated by **artificial intelligence** and machine-to-machine learning. Along with others, he has started a company called Neuralink that is researching the possibility of linking the brain to the Internet.

Donna J. Haraway in her "**Cyborg** Manifesto" (1984) also agrees with the above definition that a **cyborg** is "a hybrid of machine and organism" but adds that it is "a creature of social reality as well as a creature of fiction." She combines the ideas of Michel Foucault in *The Archeology of Knowledge* concerning the definition of the **archive** as an enunciative and heterodoxic discursive field with notions of extended and embodied cognition. Like Foucault's notion of the **archive**, the **cyborg** as she understands it is an assemblage of ideas that manifest outside of language and constitute a means of emancipation. She states in her manifesto that, "**Cyborg** politics are the struggle for language and the struggle against perfect communication, against the one code that translates all meaning perfectly, the central dogma of phallogocentrism. That is why **cyborg** politics insist on **noise** and advocate pollution, rejoicing in the illegitimate fusions of animal and machine." As such the **cyborg** and the re-conceptualized framework it is imbedded in constitutes a new beginning for woman's work especially an escape from the informatics of domination.

DATA MINING **Data mining** refers to extracting or "mining" relevant information from large amounts of data stored in databases, data warehouses, or other such repositories. According to Jiawei Han, Micheline Kamber, and Jian Pei in their book, ***Data Mining****: Concepts and Techniques* (2000), mining is the fifth step in what is referred to as "knowledge discovery." Knowledge discovery, includes: 1. Data Cleaning (removing **noise** and inconsistencies); 2. Data Integration (combining multiple databases); 3. Data Selection (retrieving relevant data); 4. Data Transformation (transforming and consolidating data); 5. **Data Mining** (looking at data and extracting patterns from it through intelligent methods); 6. Pattern Evaluation (identifying interesting patterns); and 7. Knowledge Presentation. **Data mining** functionalities specify the kinds of patterns the process targets. In general, data-mining tasks can be classified into two categories: descriptive or predictive. Descriptive mining tasks characterize the general properties of data in the database. Predictive mining tasks make inferences from the current accumulated data set in order to make predictions.

DATAISM According to Yuval Noah Harari in *Homo Deus* (2015), the universe consists of data flows and the value of any phenomenon is dependent on its contribution to data processing. He then shows that **Dataism** was the result of two scientific trajectories. The first, emanating

from the theories of Charles Darwin's *On the Origin of Species*, sees organisms as complex assemblages of biochemical **algorithms**. Not only individual organisms but entire societies such as beehives, bacteria colonies and forests are seen as data processing systems. The second stream was generated in the aftermath of Alan Turing's formulation of his Turing Machine and has resulted in the development of constellations of sophisticated **algorithms** working together. **Dataism** puts the two systems together, the biochemical and the electronic, resulting in the collapse of the " barrier between animals and machines, and (**Dataism**) expects electronic **algorithms** to eventually decipher and outperform biochemical **algorithms**."

DEBT

Debt concerns a transaction in which one party borrows from another in order to make a purchase that they would not be able to make using their own **capital**. In return, the party borrowing money agrees to pay back the other party according to a particular schedule of payments, usually with interest paid annually. Credit card **debt** functions similarly except that it has an open-ended repayment arrangement. **Debt** also means the state of owing money you cannot pay back. In fact as Sven Lütticken has wryly surmised in ***Cultural*** *Revolution* (2017), "Workers may produce value less through their 'official' job and more through the **debt** that they amass."

According to Maurizio Lazzarato, in his book*, The Making of the Indebted Man* (2012), in neoliberalism a new category of subjectivity has emerged called the "indebted man" or *homo debtor*. Following the lead of Nietzsche, Lazzarato focuses on the creditor-debtor relationship—instead of the historically important concept of exchange—as the essential component of economic thought. Importantly, in our moment of **real subsumption**, where life itself is work, **debt** has also come to inhabit all sectors of life. Except for a very small few, we are all debtors. Using the American University system as a prototype of a credit-debtor society, Lazzarato shows how all social relations are now subject to this relationship.

DECOLONIZING THE MIND

Decolonizing the Mind, refers to the book of the same title published in 1986 by the Kenyan novelist and post-colonial thinker, Ngũgĩ wa Thiong'o. His work builds on the ideas already espoused by Frantz Fanon in his books *Black Skin White Masks* and *The Wretched of the Earth*. The central theme being the role played by the colonizer's language, specifically, in the Kenyan case, English, as a tool of colonialist repression. At issue are the repressive qualities of the imposed language on the formation of thoughts and ideas as well as the resulting lack of development of indigenous languages The new socio-political-**cultural** forces operating in the 21st century, e.g. semiocapitalism, in which, the exploitation of digital production, is exerted upon (and through) semiotic flux and **cognitive capitalism**, in which the brain and mind constitute our new workplace, produce a new urgency for what Thiong'o, in 1986, referred to as the "domination of the mental universe of the colonized." The controversy of whether the relationship of language and thought can be untangled, or if thought can even exist without language is moot. Thought can be accomplished without language, monkeys can make decisions based on judgments, and orangutans can plan for the future, two characteristics once thought to be language dependent. But, as a means of a socially shared symbolic system, there is no doubt that language improves what is referred to as "mediated cognition." Mediated cognition refers to the psychologist, Lev Vygotsky´s, assumption that mental activity is arbitrated by culturally-derived sign systems as a result of a process of **internalization**. As he stated in his essay, "Development of the Higher

Mental Functions" (1966), "The child begins to practice with respect to himself the same forms of [linguistic] behavior that others formerly practiced with respect to him," and, thus, the individual, through interaction with others, recreates externally-perceived shared social operations on the internal plane. This process of **internalization** becomes materialized as neural architectonics as we know from studies of the development of cerebral lateralization of the dominant left language hemisphere, as well as neuropsychological research on inner speech of **working memory** that implicates a parietal-temporal lobe and cerebellar contribution. It is worth noting that cerebral asymmetry also engages other language-related dispositions such as sequential analysis and mathematical calculation. The implications of Vygotsky's theories for the practices of colonization of the mind and its deconstruction, through the process of decolonizing and refusal, take on even greater significance in our moment of **cognitive capitalism** in which language-based processes of **valorization** and linguistic rehearsal in **working memory** are important. What effect new speech recognition and machine translating devices, like the Pilot earpiece recently developed by Waverly Labs, will have on language development and evolution is hard to know at this time.

DEEP HISTORY or DEEP TIME **Deep history**, or "**deep time**," is an understanding that human history does not begin with recorded history ten thousand years ago. As Dipesh Chakrabarty suggests (quoted by Catherine Malabou in her article, "The Brain of History, or, The Mentality of the **Anthropocene**," 2017)) a neurohistory of the **Anthropocene** is not enough. Accordingly, any idea of **deep time** that limits itself to human history misses its geological dimension. One must delve into a moment of deep prehistory—as Quentin Meillassoux's "arche-fossil" does—to understand man's historical

beginnings. A neuro-archaeological approach, as espoused by Lambros Malafouris, would greatly extend the idea of **deep history** beyond the history of humans and intimately relate it to an ecology of embeddedness. I would speculate that the human being is not simply a result of its own evolution, but rather the consequence of a long history of serendipitous interactions and relations constituted by inorganic and organic chemical reactions, prokaryotic and eukaryotic cellular proliferation, and combinations of unicellular and multicellular experiments. Together, these interactions constituted the basic building blocks of life, eventually forming the hominid species. **Deep history** gives new meaning to Gerald Edelman's idea of the **primary repertoire**. It provides a deeper context, beyond its anthropocentric derivation, understanding the **primary repertoire** as a long process initiated in the prehistory of man's genetically-programmed neural architecture, or **neural zoe**. **Deep history** represents the evolutionary contributions of all previous genetic experiments in the history of life. One example is the endosymbiotic theory formulated by Lynn Margulis, which postulates that mitochondria are the result of the endocytosis of aerobic bacteria by anaerobic bacteria 1.5 billion years ago, creating a symbiotic relationship and an evolutionary advantage.

DEEP LEARNING **Deep learning** is a form of untrained, artificial neural network-based cognitive labour, or deep neural network, with many hidden layers. The goal of **deep learning** is to learn feature extraction without human intervention. Since the structure of the input is unknown, **deep learning** extracts hidden dependencies, patterns, or regularities from data. Human interference is kept at a minimum and the **algorithm** is allowed to make discoveries for itself.

DEFAULT NETWORK STATE According to Randy L. Buckner, in his article "The Brain's Default Network: Origins and Implications for the Study of Psychosis" (2008), the **default network state** is a set of brain regions that are active in the brains of resting experimental subjects, especially those who are daydreaming and not paying attention to or engaging with an externally-oriented task. The term ultimately is a misnomer since later research uncovered **default network state** activity during directed tasks like remembering one's own past or when one is cogitating about the future, leading to a theory that one of the default neural state's most important functions is to support internal simulations that are used adaptively.

The regions of the brain that participate most actively in the **default network state** are the association cortex, paralimbic regions—such as prefrontal cortex—insula, the inferior parietal lobule, the lateral temporal cortex, cingulate cortex, and hippocampus. I am speculating that in **cognitive capitalism**, daydreaming, like sleep and dreaming, will become, on the one hand, a site of ever-increasing control and, on the other, creative **dissensus**.

DEGENERACY The remarkable resiliency of cognitive functions to stroke and trauma is related to the concept of **degeneracy** in which multiple neuronal systems can sustain the same outputs by implementing multiple, but distinct, cognitive systems that produce the same action. Although one degenerate network might be affected by a stroke, the other remaining elements may preserve a particular neural function. In other words, there is not simply a one-to-one mapping between neuronal structures and cognitive functions, but rather multiple assemblages and pathways that produce similar functions. **Degeneracy** is prevalent in the genetic code, immunologic systems, and neural networks. As Gerald Edelman and Joseph A. Gally have written in "**Degeneracy** and **Complexity** in Biological Systems" (2001), **degeneracy**—unlike redundancy, which occurs when the same function is performed by identical elements—involves structurally different elements that yield the same or different functions, depending on the context in which they are expressed. **Degeneracy** is also important for the continued evolution and increase in **complexity** of the nervous system.

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DENDRITES **Dendrites** are the parts of a **neuron** that receive incoming information from the axon terminals of other **neurons**. They can consist of a single projection jutting out from the soma of the neuron, or of thousands of branches, all of which have the potential to react to chemical transmitter release. Short projections on multi-branched dendritic trees are called "spines," and are important for **memory** and signal transmission. These connections can be excitatory or inhibitory. Some cells, like photoreceptor cells, do not have **dendrites**.

DÉRIVE or DRIFT Along with ***détournement*** and **psychogeography**, *dérive*, or **drift** is an important Situationist technique used to change one's experience of the city. It is defined as a transient passage through varied ambiences. In "Theory of the Dérive" (1956), Guy Debord characterizes it as a playful and constructive behavior differing from a pastime or an aimless stroll. Drifters make discoveries and jot down notes, fieldwork that can later be used in new, collectively created routes and pathways through the city. For Debord and his associates, the ***dérive*** was an equal combination of chance and planning. The Situationist tactics of the ***dérive*** and **psychogeography** critiqued the rational, idealist city proposed by Le Corbusier in projects like the *Ville Radieuse*. In contrast to Le Corbusier's rational city, the complex environments and chance

encounters of the Situationist City create different spatial and temporal experiences, ***gestalts***, and affordances. These new temporal and spatial logics insinuate themselves into the **cultural** landscape at hand resulting in their adoption. When they are sufficiently entangled with it, they become repeated and provocative, and first engage the perceptual-motor-cognitive system and then the material brain in the form of **memory**. These, in turn, lead to different neural material dispositions and repercussions for the neural activity in the global workspace involved in conscious **working memory** and thought.

DÉTOURNEMENT Along with **psychogeography** and the *dérive*, ***détournement*** is one of three important terms describing the Situationist International's relationship to the urban environment. ***Détournement*** is usually translated as "diversion," although the original French is more nuanced, referring to hijacking, embezzlement, misappropriation, and corruption. It was developed as a technique to steal preexisting art forms from their original contexts in order to liberate and ultimately transform them. Importantly, ***détournement*** was also used to critique consumer society and pop culture. Its use in response to architecture and the city, however, was most relevant for the Situationists, and for our purposes here. By combining all art mediums and processes with older forms of architecture in a synthesis of the new, it played a role in Unitary Urbanism and the "*détourned* city."

DISCIPLINARY SOCIETY The **disciplinary society** is a system of physical enclosures and footprints, that form a grid of disciplinary measures through which processes of normalization, acting upon the multiplicity of differences of its delegates, assures the cohesion of the social body. During the coronavirus outbreak we have

entered the disciplinary society 2.0 in which disciplinary society and its ability to quarantine and sequester has been aided by the new technological innovations of the society of control and the society of surveillance.

DISSENSUS In order to understand **dissensus**, we must first understand the concept of consensus upon which it acts. Consensus, according to Jacques Rancière in his book, ***Dissensus*** (2010), concerns new ways of governing that avoid conflict by constructing forms of agreement distributed in a population of minds through arbitration and expertise. According to Rancière,

> It is perfectly fine for people to have different interests, values and aspirations, nevertheless there is one unique reality to which everything must be related, a reality that is experienceable as a sense datum and which has only one possible signification.

It is at this accepted single and unique signification that **dissensus** takes aim. For, key to **dissensus** is the mutation of the conditions that define the regimes of sensibility in such a way as to make possible the expression or concatenation of other composites of individual becomings that describe the **multitude**. Art and politics are conjoined in this endeavor as political aesthetics to reconfigure, according to Rancière, the fabric of sensorial experience, and, I might add, the fabric of configured experience according to actively engaged environments of affordances and networks of attention.

Key to this notion of **dissensus** is the idea of fiction, which Rancière does not use in the conventional sense of constructing an imaginary world. Rather:

> Fiction is a way of changing existing modes of sensory presentations and forms of

> enunciation; of varying frames, scales and rhythms; and of building new relationships between reality and appearance, the individual and the collective.

In other words, **dissensus** does not refer to a conflict of opinions, values or interests, but, rather, redraws the frames that common objects inhabit, freeing these objects, relations, and the individuals that are constrained by them, from the tyranny of, for instance, their hierarchical arrangements. As such, different populations of individuals will be called forth by these different agreements of sensuality and sensorial processing; in **cognitive capitalism** this distribution of sensibility and the fictions and forms of **dissensus** that it engages also have consequences for the brain. Estranged distributions of sensibility and the various networks of ***gestalts***, affordances, and the attentive reading they engender, sculpt the **neural plasticity** of the brain differently, stabilizing altered populations of labile neural networks that stand in for the subject. Today, this aesthetic capacity of art, in the political sense, is a means to disrupt the **extended mind** of the **cognitariat** through its position with regard to the system of institutional relations imbedded in designed space (be it real, imaginary, or virtual), which it disturbs, and the new neural architectures these relations create.

DISTRIBUTION OF THE SENSIBLE/INSENSIBLE (DOSI) **DOSI**, an acronym for the distribution of the sensible/insensible, extends Jacques Rancière's notion of the **distribution of the sensible** (DOS), discussed in his book, *The Politics of Aesthetics: The* ***Distribution of the Sensible*** (2004), to include immanent and insensible intensities, like Junk Space, that also participate in establishing the modes of perception of a people. Rancière proposes that our sensible environments are designed to create homogeneous experiences that organize and police our free will. The **distribution of the sensible** determines who has the power of doing, and ways of seeing which determine who has the power to name the sayable, the thinkable, and the possible. In **cognitive capitalism** the **distribution of sensible** and insensible has been captured by the network where the cognitarian spends more and more of his or her time.

DIVERGENT THINKING **Divergent thinking** is a process of solving a problem from the many possible solutions that are available at a particular time. Certain substances, such as **ayahuasca**, promote **divergent thinking** by suppressing the normal modulating activities of the frontal cortex, which is a source of convergent thinking (i.e. the generation of a single optimal solution).

DIVIDUAL In his essay, "Postscript on the Societies of Control" (1992), Gilles Deleuze recognizes that, in the journey from **disciplinary society** to the **society of control**, the individual is transformed into the "dividual." This **dividual** is a physical human body that is endlessly divisible and reducible to abstract data representations *via* modern technologies of control (like computer-based systems). The core of Deleuze's idea of the **dividual** is that data is used in an endlessly recombinant way against—rather than for the welfare of—humankind.

DUENDE According the 20th century Spanish poet, Federico Garcia Lorca, **duende** is:

> A mysterious force that everyone feels and no philosopher has explained. So, then, the **duende** is a force not a labour, a struggle not a thought…'The **duende** is not in the throat: the **duende** surges up, inside, from the soles of the

> feet.' Meaning, it's not a question of skill, but of a style that's truly alive: meaning, it's in the veins: meaning, it's of the most ancient culture of immediate creation.

Duende is a term initially found in descriptions of Flamenco culture. It is an unexplained affective state evoked by a performance, which infects an entire audience, sending chills up their spines. Its meaning has recently expanded to include **poetry** reading, song, and performance. For **duende** is a dynamic meandering doodle in the brain's nervous circuits and leaves no trace as memories, but just a vague feeling of rapture. Its 'beyondness' is its power. **Duende** unwittingly echoes Guattari's description of the *ritournelle* (itself a musical motif) as an important producer of subjectivity. **Duende** unveils the limits and liberates the repertoire of collective emotional and affective responses. It activates social spaces in which the actors'/agents'/dancers' specialized abilities stimulate other experiential linkages, diagrams and networks of sensation leading to linguistically unclassifiable responses in the **flesh** of the brains of an audience. It registers in no geometries or topologies, and this is where it differs from other forms of **cultural** production that normally inscribe themselves in **cultural memory** systems such as designed spaces and the filmic screen. **Duende** always exists as "other," never being tethered to larger symbolic systems; although symbols can be used to attain its orgasmic resonating dissonance. Even when acts of **duende** leave residues of passionate outbursts like broken wine glasses thrown against the wall in the heat of the passion of a song, or broken walls, the result of a smashed fist to emphasize a crescendo, they are random events that are simply traces in anarchic displays rather than aspects of larger repertoires made from repetitive acts and patterns. Its memories are iconic and vivid but evanescent, decaying rapidly and they share similarities to those memories of dreams that cannot be recalled. It registers as a lack because it cannot access the necessary conditions, like repetition and synchronicity, that are required to increase neural efficiency, amplify neural connection, and, thus, produce eidetic **memory** or photographic **memory**. Potential **synapses** may form, but they are not retained, and although variable nervous elements are called out, their activation is momentary. The subject is left with a vague feeling of an event that may have happened, and like a college student recounting his bout of drinking the previous night to his classmates who states, "I got totally wasted last night and was driving home and found myself on the side of the road. I have no idea how I got there." It is the Snapchat of artistic interventions, and, in this way, hews close to Paolo Virno's notion of **immaterial labor** that does not leave a trace. **Duende** does not leave a recallable retraceable event as a modification of the neural architecture of the brain. Or, if it does, it is an activity located in the deeper, ancient parts of the brain cut off from normalized linguistic translation and codification. Like an optical illusion, which leads to seizures in predisposed individuals, **duende** confronts the neural **apparatus** with its own limitations, and, as a result, leaves the brain in a postictal state. Its essence, therefore, is a temporary rebuke to **cognitive capitalism**.

EARLY CC or EARLY COGNITIVE CAPITALISM According to Yann Moulier-Boutang, in his book ***Cognitive Capitalism*** (2011), **cognitive capitalism** takes root around 1975. **Cognitive capitalism** is divided into an early and late stage. This early stage marks the beginning of the importance of **immaterial labor** and computation in the workplace. It is described by the following five conditions that are the result: (1) Labor becomes

precarious as one is no longer guaranteed a lifelong job; full-time employment is subsumed by part-time employment, freelancing and self-employment. (2) Labor shifts from object production to immaterial products such as knowledge and information. Additionally it creates emotional responses and beliefs. (3) **24/7** marketplaces and the global infrastructure are creating sleepnessness in many cognitive laborers or cognitariats working beyond single time zones and limited physical workspaces. The **formal subsumption** is replaced by **real subsumption** in which our work becomes our life.

We are bodies caught in the reticular communicative space of the collective virtual space and we function as a hub inside a distribution network constantly buzzing. (4) We now live in a **valorization** economy in which the value of the object is no longer tethered to its monetary worth as it moves off the assembly line but rather the imaginary, speculative characteristics it accrues inside the commodity networks established in the desiring machine of the brain of the **cognitariat**. (5) **Financialization** of **capital**, our fifth descriptor, is a result of herd behavior linked through digital investing on a massive scale and the effects of a mimetic rationality.

EMBODIMENT AND EMBODIMENT THESIS Embodiment, as understood here, echoes the idea of Maurice Merleau-Ponty as summarized by Francisco Varela et al. in their book *The Embodied Mind* (1991). **Embodiment** is understood in the double sense as encompassing the body as a lived experiential structure as well as functioning as a contact or milieu supporting cognition. Shaun Gallagher, in "Interpretations of embodied cognition" (Gallagher 2011), explains that the core concerns of embodied cognition are that the body cannot be uncoupled from its environment and that **embodiment** cannot be reduced to neural activation alone.

The **embodiment** theory or embodied mind recognizes the importance of an agent's physical body to the act of cognition. By physical body is meant its anatomy and capacity to move prior to and after processing. Non-neural anatomies are also important; the shape and position of the two eyes for binocular and depth perception or the position of the ears for aural direction detection. According to Gallagher, hormonal changes, as well as, visceral and musculoskeletal processes can bias **memory**, attention and decision-making. Even the way we think and the ideas we conjure are based upon conceptual associations that are body centric. Quoting Shapiro, Gallagher suggests that if our eyes were located on our knees we might associate crawling with torture. But even the structure of our abstract thinking, as it manifests in our minds eye, is based upon our spatial and motor behaviors as for instance how we might imagine and envision turning a screwdriver in our minds eye echoes are learned experience of turning that screw in our real experience.

The distinguishing characteristic between the embodied or, as it sometimes called, the embedded mind thesis is the role played by the external props or scaffolds used in thinking. The distinction is quite fuzzy as the brain, body, world, especially its social relations, are linked together. In embodied cognition the body's capacities become perceptually linked with information left offloaded in the environment to be used when needed as part of its performances. Metaphorically speaking one could think here of the embodied mind as it functions within the model of an extended phenotype in which an evolved body performs with an assemblage of coevolved affordances ready in the environment, a kind of immanent niche, to which it is coupled. The external prop and its stage is exploited at the right moment by the body but it would never

be mistaken for a disembodied thought or cognitive module of an internally located thinking system.

The role of plasticity is key here. The plastic body and plastic brain are very different. The plastic body's capacity to change is more limited than the neuroplastic brain. This key difference is a determining factor in the difference between the embodied and **extended mind**. Embodied external props remain separate and disjunctive whereas they become seamlessly integrated into the **extended mind**. According to Michael Wheeler in his essay "Thinking Beyond the Brain" (Wheeler 2011), in the extended cognition hypothesis the external scaffold or props are accorded a special status as a component of the cognitive module.

EMERGENCE According to Steven Johnson in his book ***Emergence**, The Connected Lives of Ants, Brains, Cities and Software* (2001), **emergence** describes the movement from low-level rules to those of higher-level sophistication. **Emergence** becomes discernable when multiple agents following local rules involved in local interactions produce coherent behavior at the macro level well suited to its environment. Emergent **complexity** results when these local interactions produce behavior over time that are adaptive and smarter over generations creating recognizable patterns.

EMPIRE **Empire**, as described by Michael Hardt and Antonio Negri in their book of the same title, is constituted by three conditions. First, it is a contemporary sociocultural-economic order with global political implications and ambitions. Second, this imperial power represents a social transition from a **disciplinary society** to a **society of control** in which mechanisms of command become ever more "democratic," ever more immanent to the social field, distributed throughout the brains and bodies of the citizens.

This process is increasingly interiorized within subjects themselves, a process referred to as "endocolonization," and is exercised through machines that directly organize brains and bodies in communication systems and information networks. The third condition describes Italian **post-*operaismo***, which regards the new conditions of **immaterial labor** as productive of subjectivity itself.

Empire is a condition all of us are located within, all individuals, institutions and states. **Empire** has no 'exteriority' or outside; it is not to be confused with *imperialism*. Negri in interviews has stated that revolution is not only *within **Empire*** but also *through **Empire***. This is where the **multitude** comes in. Different from the traditional concept of the **working class**, or '**the people**', the **multitude** is more diffuse – its struggles could include identity politics, open access programming, and the living wage as much as factory working conditions. The concept of the **multitude**, which Negri took from Spinoza, crystallized at the same time as the first wave of the anti-globalization movements (ironically, given that Negri is anything but anti-globalization): one could say that **Empire** seeks to promote the globalization of the market (and/or the military industrial complex) while the **multitude** seeks to promote a truly open form of globalization: no borders.

ENVIRONMENTAL ENRICHMENT Enriched environments for rodents being tested for the effects of **environmental enrichment** on cognitive performances include the following conditions:

1
Complex environments full of novelty.

2
Being housed in large cages with many socially engaged conspecifics.

3
Being surrounded by many toys as well as tunnels and running wheels for exercise.

Rodents living in enriched environments have been shown to manifest increased density and activity of dendritic spines located in the brain, important for **memory** function and increased **neural plasticity**. It is, therefore, not surprising to discover that **environmental enrichment** and the complex neural networks it fosters are crucial to the proper development of behavioral **flexibility** in animals that are due to be released into wild from captivity. In humans, defining enriched environments has been difficult because data measuring the effects of living in complex urban environments full of novelty, which leads to similar neurobiological changes as those found in rats like increased dendritic spine density, is contaminated by the adverse psycho-social conditions that those environments also produce.

EPIGENETICS **Epigenetics** refers to the mechanisms through which the environment and culture modulate the genome by turning regulator genes on and off. This affects **gene** expression in time, and in turn phenotype. Additionally, as understood by Jean-Pierre Changeux and pertinent for us here, it explains how the environment affects the organization of neurons and the neuronal networks in the brain they form. In his essay, "A Theory of the Epigenesis of Neuronal Networks by Selective Stabilization of **Synapses**" (1973), he describes the process of selective stabilization, or pruning of labile **synapses**. In **cognitive capitalism**, epigenesis makes possible the network's capacity to sculpt the architecture of the brain during critical periods of development.

EPIGENETIC ARCHITECTURE **Epigenetic architecture** is the name I assign to the ways architecture and design engage the brain's neuroplastic **pluripotentiality** to modify and modulate its gray and white matter. It describes a dynamic and event-related architecture that embraces John Frazer's idea of "genetic architecture" as its foundation. It consists of three concepts:

1
Architecture is considered as a form of artificial life, subject to, like the natural world, principles of **morphogenesis**, genetic coding, replication and selection.

2
Architectural concepts are expressed as generative rules that may be accelerated and tested. These rules are described in a genetic language that produces a code-script of instructions for form-generation. Computer models are then used to simulate the development of prototypal forms that are then evaluated on the basis of their performance in a simulated environment.

3
The perfection and variety of natural forms is the result of the relentless experimentation of evolution. By means of profligate prototypes and the ruthless rejection of flawed experiments, **nature** has evolved a rich biodiversity of interdependent species of plants and animals that are in metabolic balance with their environment. Similar pressures interact with generated architectural forms. Even though Fraser uses the word "epigenetic" on a number of occasions, he does not use include its processes in his theories. The production of form is essentially based on the

natural selection of generated forms interacting in a field. Those forms persisting are considered the "fittest" and continue to inhabit the **cultural** habitus. **Epigenetic architecture** adds another level to this process. Those persistent forms then feedback upon the pluri-potential brain to sculpt its variable population of **neurons** through the process of stabilization and pruning of its labile **synapses**. Changes in the design and architecture of built space are accompanied by similar but different changes occurring in the brains neural architecture.

In **late cognitive capitalism** architecture and design take part in the process of form-finding occurring intra and extra cranially.

EPIPHYLOGENESIS Richard Iveson, in his essay "Misreading Derrida: Stiegler, **originary technicity**, and the différance of différance" (2011), quotes Stiegler in defining **epiphylogenesis** as "conservation, **accumulation**, and sedimentation of successive epigeneses, mutually articulated." **Epiphylogenesis** is the process through which the phylogeny of the technical species or the evolution of technical apparatuses in time is transmissible. Through a process of multiple **exteriorizations** human matter becomes entangled with technics or organized inorganic matter. In "Cinema as mnemotechnics: Bernard Stiegler and the Industrialization of **Memory**" (2006), Ben Roberts describes a "new process of **exteriorization** whereby the interior of the living being becomes inextricably bound up with an exterior realm of tools..." The history of the human is therefore no longer strictly in the realm of genetic evolution but that of technical evolution (or the evolution of "organized inorganic beings") in which it is impossible to separate the living being from its external prosthetic technical support. Stiegler distinguishes this technical evolution from biological evolution (phylogenesis) by callingit **epiphylogenesis**.

ERGONOMICS **Ergonomics** concerns the design of the workplace or work system in which humans interact with machines in order to maximize their potential. Importantly, the focus is on how the workplace is designed for the best and safest human interaction, the emphasis being on the human. Attention to an expanded definition of **ergonomics** in recent years to include such things as workstation and job design, and worker relations has resulted in greater worker satisfaction and decrease in physical complaints. Cumulative Trauma Disorders (CTDs) concern the upper extremities of ergonomic problems and consist of repetitive motion injuries such as carpal tunnel syndrome and tendinitis. Attention to ergonomic principles can reduce the occurrence and severity of these disorders. Recently, attention has been focused on visual and cognitive **ergonomics**, in which immaterial workstations situated on computer screens and interfaces produce new challenges for sensorial and cognitive systems.

ESTRANGEMENT In his book, *Theory of Prose (1925)*, Viktor Shklovsky understands the word "**estrangement**" as a device to free our historically contrived, formulaic perceptions into true visions. **Estrangement** is an **apparatus** that fights against the automatization and habituation of conscious percepts and their subsumption by the unconscious, a process that pushes many people's entire lives to an almost unconscious level, as if their **autonomy** had never existed. Shklovsky finds art's purpose as means to return "sensation to our limbs, in order to feel objects, to make a stone feel stony." **Estrangement** is a process that destabilizes optimization, which is vital to practical prose, for example, but

has little to do with **poetry**. Rather than finding a means to pack as many ideas into the smallest number of words, the poet's role is to complicate form and to make the process of **creativity** intricate, thorny, and laborious.

EXTENDED MIND The **extended mind**, a concept first developed by Andy Clark and David Chalmers in their article of the same name (1998), states that the mind and the world are a coupled system. The distinction between what happens in the external world and what happens in the brain is conceptualised in arbitrary ways: the two systems are constitutively intertwined, and, as such, collapse the mind-brain dichotomy. The **extended mind** differs from the idea of the embodied mind. In the **extended mind** the vehicles that accord thinking and thoughts are distributed over the brain, body and world in such a way that the external props and scaffolds that make it possible are accorded cognitive status. As Michael Wheeler understands in "Thinking Beyond the Brain: Educating and Building from the Standpoint of Extended Cognition," "For the extended cognition theorist, then, the coupled combination of pen-and-paper resource, appropriate bodily manipulations, and in-the-head processing counts as a cognitive system in its own right, a system in which although the differently located elements make different causal contributions to the production of the observed intelligent activity, nevertheless each of those contributions enjoys a fully cognitive status." (Wheeler 2011)

This view serves as a foundation for understanding cognitive activism. One might say that the evolution of political apparatuses that form the foundation of modes of sovereignty and government are mirrored and become coextensive with analogous forms of political rationality operating in the brain; a political rationality that is material. Bernard Stiegler uses this metaphor in formulating his theory of **originary technicity**. He argues that time itself, in its ontogeny—that is to say, the following of photographic stillness by cinematic dynamism, for example—recalibrates the brain's capacity to understand new registers of time to the extent of it being able to appropriate these new understandings of time to create new imaginary narratologies in **the mind's eye**. Characters in the imagined scenario can move at impossible speeds experienced in the movie theater.

EXTENSIVE SPACE As Manuel DeLanda states in *Space: Extensive and Intensive, Actual and Virtual* (2005), extensive space is best understood as a space of boundaries which are limited by a frontier and which define our biological and social realities. Quoting Gilles Deleuze, he further defines these spaces as thermodynamic entities, which do not describe spaces, but quantities. Extensive quantities are additive. These spaces differ from other kinds of magnitude, which are referred to as "**intensive** quantities." **Intensive** spaces and times are not divisible. Highly differentiated **extensive spaces** are produced by intensities, such as are found in the developing embryo in which the process of **morphogenesis** creates **intensive** diffusible gradients of chemical agents, which turn genes on and off and produce extensive elements with real boundaries.

EXTERIORIZATION Bernard Stiegler, borrowing from André Leroi-Gourhan, understands the process of **exteriorization** as a fundamental element of in the development of the brain itself. As he states in his book *Technics and Time, 2: Disorientation* (2008), "[t]he interior is constituted in **exteriorization**," and *vice versa*. **Memory** is exteriorized from the very start of hominid evolution in early lithic technology. The tool invents the human. Although stone tools were not made to store **memory**, *per se*, they incited a series of learned motor actions, like flexing the elbow in the act of killing or chopping.

Continuing on with Stiegler, the actual external storage of **memory**, "mnemotechnics," would have to await the invention of writing and marking. Writing stabilizes language with material consequences, both in the world and in the brain. Like the earlier flint tool, it becomes an epiphylogenetic vector for advanced corticalization. Later, with the invention of the PDA or "personal digital assistant," a full-fledged mnemotechnology was invented that actually ordered **memory**. Today, the **memory** stored within smartphones and tablets creates a digital log and personal profile used by software agents and **algorithms** to manage future choices.

We now find ourselves in a situation of reverse-mnemotechnics. Instead of expanding the capacities of the human mind and brain, a loss rather than a gain is occurring. Contemporary technologies are sublime and have become delinked from the interiorization-**exteriorization** dyad. They outsource and delink brain function from its grammatical roots without emancipating it. Neuropower constitutes the conditions of the asymmetric power relations subsuming this evolutionary process by means of the technologies of neuro-capitalism, in which the neurobiological commons is being privatized for corporate ends. The programmability of the neurobiological substrate is becoming commoditized by a horde of new neuro-technologies, like **brain-computer-interfaces** and cortical modems, that are subsuming the organic **flesh**liness of the brain —its epigenetic linkages—for their own devious practices. The brain is, in fact, dependent and precarious with a foreknowledge of its immanent disconnection from the information vital to its sustenance. When long-term **memory** is increasingly outsourced to mnemonic and computational machines in **cognitive capitalism**, what is at stake, first and foremost, is our capacity to independently call up the contents of long-term **memory** to create scenario visualizations in our working memories. **Working memory** is the process by which we call up and buffer long-term memories for use in online, real-time problem solving in **the mind's eye**.

In neoliberalism, it is **the mind's eye** that is the new site of the processes of governmentalization. If these external sources one day become monetized, unavailable, censored, or hacked, due to a corporate greed or governmental whim, we will be left enfeebled and cognitively amputated. More importantly, as we have learned from the experiments of Véronique Bohbot, people who follow turn-by-turn directions—like those given by a GPS device—activate a different part of the brain than is usually used in spatial-**memory** navigation. In their book, *GPS Declassified: From Smart Bombs to Smartphones* (2013), Richard D. Easton and Eric F. Frazier quote Bohbot's claim that over-reliance on GPS devices could lead to age-related degeneration of the hippocampus, and an increased risk of dementia. What is true for spatial **memory** might be true for face recognition and mathematics. Will new skill sets created by new forms of technology, like telepathic devices, lead to new cognitive abilities or disabilities?

EXTERNALITIES (POSITIVE AND NEGATIVE) **Externalities**, or external effects, is a term from economic theory that refers to the resulting footprint left by humanity directly or unwittingly upon the biosphere. The term "**externalities**" in economics is more general including a range of phenomena not used in pricing models but which are consequences of economic activity. Synonyms include collateral effects, by-products, and joint effects. They can be positive, when the effect in question increases resources and the power of action of one or several of the contributing agents, and negative if the effect does the opposite by diminishing resources or well-being, causing damage to third parties. According to Yann Moulier-Boutang in ***Cognitive Capitalism*** the concept

of **externalities** is excluded from classic economic theory, but lies at the base of complex systems and the multiplicity of interactions and effects constituted by non-market effects.

Sociologists speaks about negative **externalities** when they discuss the disappearance of the social bond or disaffiliation of the unemployed resulting from the appearance of a new economy that displaces a predecessor, as in the case of the **information economy** upon the industrial laborer. Other examples of negative **externalities** include the effect of industrialization on the environment due to pollution, like the condition of the rivers in Guyana due to gold mining, for example, or the use of arsenic to release precious metals. Positive **externalities** can be found in what is called the "Library Effect" whereby interacting with a large number of people and having access to their summed intellectual capacities or collective intelligence increases the chances that one will be able to find the answer to a question one might ask them, or, in the case of the Internet, "asking" Google.

EYE TRACKING **Eye tracking** is a technology that monitors a subjects' attention to objects and their position in space by measuring eyes movements, positions, and points of gaze. Other indexes measured during **eye tracking** are blinking patterns, pupillary dilation and constriction especially during emotionally charged stimuli, and disattention, what the subject disregards or looks away from. The eye movements most important for **eye tracking** are fixations, saccades and smooth pursuit. Fixations occur when the eye attempts to stabilize an image on its fovea, the area of the most refined vision located centrally in the **retina** composed of cone cells. The eye stops to collect information and the length of time or duration that it fixates upon an object is related to its attention grabbing capacity and its importance. Saccades are fast conjugate movements of the eye that shifts the center of gaze from one part of the visual field to another. They are voluntary and involuntary and can be horizontal, vertical and torsional. They are not as important for **eye tracking**. Finally smooth pursuit are eye movements that smoothly follow moving objects without catch up saccades. They are most smooth in the horizontal direction. **Eye tracking** can be standard or 3-D.

Eye tracking is used by companies in various ways to enhance customer engagement, for instance, in product placement, package design, on-line advertisement and website design. With the increased time that individuals spend online, **eye tracking** has become important for the improved efficiency of online labor. Recently **eye tracking** has been combined with 360 degree **eye tracking virtual reality** to create virtual shopping environments for consumer analysis. As the Tobii Pro website announces "Advertisers can now test their communication campaigns before they hit the market to make sure that the intended perception of their messages actually gets through to the shopper. In a virtual store, product packaging designs, product placements, and even store layouts can be easily evaluated and then further optimized. The instant **eye tracking** statistics and visualizations will show how consumer attention is distributed, how they interact with products, and how they navigate stores."

FACEBOOK **Facebook** is a corporate online social media platform, which allows users to share posts and images. It was developed by Mark Zuckerberg in 2004 while he was a student at Harvard University. Recently, **Facebook** has received criticism for playing an important role in the distribution of "**fake news**," purportedly generated by Russian **hackers** during the 2016 US general election. In an attempt to identify "**fake news**,"

Facebook developed so-called "Disputed Flags," an intended prophylaxis against misinformation in one's newsfeed but found that this process, apparently inadvertently, buried critical information that had explained the inaccuracies and resulted in accentuating users' false beliefs. **Facebook** recently started testing a new version of its Related Articles treatment. After fact-checking articles earlier in 2018, **Facebook** found that click-through rates on hoax articles did not change as a result of the switch to Related Articles. What was different, according to the reporter, Thuy Ong, was that Related Articles led to fewer shares of the hoax article.

FAKE NEWS **Fake news**, like propaganda, is a purposefully created fictive news content used to sway popular opinion. Although propaganda has a long history, dating back to the time of the Romans (at least), it really begins to be used as an **apparatus** of governmentalization at the beginning of the 20th century. It was in Adolf Hitler's book, *Mein Kampf* (1925), that its use as a political tool and weapon was realized, culminating in Leni Riefenstahl's film *Triumph of the Will* (1935).

Historically, propaganda has been understood in positive and negative terms and is generally used to describe the dissemination of information to the public. It describes a top-down type of information distribution concocted by those in power to manipulate a public. All types of media are used in this process, from film to TV, and, now, the Internet. **Fake news** can be seen as the latest manifestation of propaganda, and, like its predecessors, **fake news** is based on highly sensational, false new stories that command much attention. Propaganda was, for the most part—especially in its early stages—a political tool, whereas **fake news** is both a political and economic tool. It is used, on the one hand, to excite a political constituency through promoting antagonism, and, on the other, as a way to promote a specific product through online advertising and social media tweets. Propaganda was an **apparatus** of print media and even carried the pejorative name "**Yellow Press**" or "**Yellow Journalism**." Such outlets were early progenitors of **fake news** (though, like the appropriation of the term "**fake news**" by President Trump to describe outlets he does not like, "**Yellow Journalism**" was often simply used as a slur by powerful people to attack news outlets and stories they did not like); they also used many of the same techniques as **fake news** today, such as eye-catching headlines, exaggeration, and scandal to increase attention, and, consequently, sales.

Fake news is spread in a top-down as well as in a bottom up fashion, and many **fake news** stories emerge from stories concocted on social media that go viral. As a result, **fake news** is an important component of the recent spread of right-wing **populism**. According to Soroush Vosoughi, et al. in their article, "The Spread of true and false news online" (2018), "the diffusion of **fake news** stories is much greater than true stories as they were distributed on **Twitter** from 2006 to 2017." Falsehoods act as a stronger stimulus than truth, and diffuses across Internet networks faster, deeper, and more broadly. It is a powerful tool in the **attention economy**, and insofar as this is true, has the potential to sculpt the material brain's neural plastic potential more potently than real and true information. Robots spread true and false news equally, despite conventional wisdom, but humans are more likely to spread **fake news**.

FINANCIALIZATION **Financialization**, as described by Christian Marazzi in his book, ***Capital*** *and Language: From the New Economy to the War Economy* (2008), is another element of **cognitive capitalism** by which the speculative economy—based on communication, mimetic rationality, and herd behavior—comes to dominate the real economy and proliferate speculative

products. Quoting the work of Robert Schiller and Hersh Shefrin, Marazzi explains the technique of "momentum financing" as a result of the investing strategies of brokers considering human behavior and taking a psychological point of view. To make money in the stock market, one no longer needs to waste time analyzing listed companies, but rather guess what stock the herd would invest in. For Marazzi, in ***Capital and Language***, **financialization** also refers to the diversion of household savings to stocks and securities. This rerouting of funds had two important consequences. First, it displaced monetary creation from its traditional home in the central bank to its new home in the "new economy," namely the financial markets. Secondly, it brought about a change in the **nature** of sovereignty itself as a society based on citizenship and the attendant representative regimes of a nationally constituted state to one rather defined by a belonging that is supranational, global, and based on herd opinion.

FLEXIBILITY **Flexibility**, as understood by Catherine Malabou in *What Should We Do with Our Brain?* (2004), is "plasticity minus its genius." In the new economy, **flexibility** is a component of success; however, it also connotes a capacity to become docile and supple, to passively take form. It, thus, lacks the essential quality of being plastic, which is the ability to create form rather than simply conforming to its impressions. This constitutes the core of Malabou's theory that the brain's **neural plasticity** is a potential source of human freedom rather than servitude. By creating new connections and networks in the world, we create new networks in the brain as well. This is source of our freedom.

FLESH "**Flesh**" (*Leib*) is typically opposed to "body" (*Körper*) in phenomenological theory, including in the embodied **phenomenology** of Merleau-Ponty where the notion

of **flesh** includes a notion of interiority that body is supposed to lack – the sense of "my own body." But there is a sense in which this kind of intuition is very dualistic, perhaps not as sharp as Descartes' mind-body dualism, but nevertheless insisting that body is merely spatial and external while "**flesh**" is intimate and personal. This issue continues to perturb debates on embodied cognition (see Clark 2008). While some materialists argue against this distinction (see Charles Wolfe's discussion of phantom limb in Wolfe 2016, and critique of the notion of "**flesh**" in Wolfe 2018), other contemporary thinkers, like Mark Fisher, elegantly embrace a version of it: "Once the body is recognised as the substrate-precondition of experience, then one is immediately compelled to accept this phenomenological dualism, precisely because experience and its substrate can be separated. There are ghosts in the machine, and we are they, and they are we" (Fisher 2016).

FoMO **FoMO** is an acronym for "fear of missing out". It came into broad public awareness around 2011, and it is one of a number of social media generated afflictions. **FoMO** is related to Internet Addiction Disorder. It is considered a form of social anxiety linked to a compulsive concern that one might miss an opportunity for social interaction as the event is posted on social media and then not be able to repost. In our increasingly virtually-centered world where we are spending more and more time interacting with the web, our very existence is confirmed by our presence there. **FoMO** does not consist simply of missing out on a social event where our friends may be, but also entails losing the opportunity to being able to *post* about it as well as a participatory agent in a communicative network. In other words, posting becomes a form of proof of ones existence in contemporary society.

Evidence suggests that excessive Internet users

affected by **FoMO** enter into a vicious cycle of loneliness and depression, as online interactions can never substitute for real face-to-face interactions, and, in a desperate attempt to fill that void, sufferers become even more obsessed with posting and tweeting to compensate.

According to Benjamin C. Riordan et al., in their article "Fear of Missing Out (**FoMO**): The Relationship Between **FoMO**, Alcohol Use, and Alcohol-Related Consequences in College Students", those suffering from **FoMO** have an unhealthy relationship with social networking sites. This pathological relationship is characterized by checking messages while driving, immediately upon waking, during the night in the middle of sleep, and during college lectures. Beyond these characteristics, people with **FoMO** may engage in excessive drinking and risk taking, either as a result of having to deal with the stress of their online activity, or because they share addictive personality characteristics that make them vulnerable to social media addiction and, thus, **FoMO**. The excessive Internet use driven by **FoMO** may cause brain abnormalities. For instance, in their article "Internet Addiction", neuroimaging scientists Kai Yuan et al. found that numerous neuroimaging studies had highlighted structural and functional abnormalities in individuals with Internet Addiction Disorder (IAD) similar to other types of addictive disorders, e.g. substance addictions and behavioral addictions. The relation between Internet Addiction and Internet Dementia, characterized by the loss of **memory**, has also been recently described.

FORMAL SUBSUMPTION **Formal subsumption** is a term derived from Marxist theory. For some Marxists, it represents a logical/systemic and historical prerequisite to "**real subsumption**"; others reject this historicist view. Marx's understanding of subsumption evolves from Hegel's description of the concept. For Hegel the process of

the abstraction of the particular is a problem because the abstraction distorts the truth and can never stand in for it. The abstract dominates the particular and does violence to it. This is where the idea of the concrete universal intervenes, expressing a specific aspect linked to a category through which the two are bound materially with the abstraction. Subsumption, in general, means the categorization of particulars under a catch-all universal concept. Whales, for example, can be subsumed under the category of "mammals," just as roses can be subsumed under the category of "flowers." In Marx, the particulars of labor as a concept are subsumed by the abstraction of money to which it is linked. In **formal subsumption**, **capital** remains formal and it does not require labor to be transformed; it simply takes hold of it insofar as it extends it. It can, for example, increase **surplus value** by increasing the length of the working day. In this way, it is absolute. In **real subsumption**, the use of technologies increases the capacity of laborers' ability to create **surplus value**, thus decreasing the time "necessary" for the laborer to make his/her own wage, or, in other words, to reproduce value. The historical consequences of the technological revolution that has transformed the laboring processes, manifested first in **post-Fordism**, and, now, in **cognitive capitalism**, takes **real subsumption** a step further, toward what Antonio Negri in his essay, "Twenty Theses on Marx, Interpretation of the Class Situation Today" (1992), refers to as "total subsumption." In total subsumption, **capital** overwhelms and dominates society and substitutes a material community for an organic human community. Echoing Mario Tronti's idea of the **social factory**, Negri elucidates the idea of the total subsumption of society and argues that labor is no longer restricted to the location of the factory, but that **capital** reaches down into the molecular structures of our bodies to extract **surplus value**.

The term "**neural subsumption**" can be understood as a subcomponent of this total subsumption used to express the future effects of the commodification and privatization of the **neural commons**.

FORDISM The two major tenets of **Fordism** are **intensive accumulation** and a monopolistic regulation of the economy. **Fordism** represented a transformation from an agri**cultural** economy to an industrial one dependent on mass production and consumption. Craft production was subsumed by industrial production characterized by dynamic and mechanized assembly lines. As a result, large factories were built and labor became abstract and standardized; each laborer performed isolated, fractionated, and repetitive tasks that were interchangeable and easily replaced. To reduce the cost of consumer products, mass production was a defining characteristic of **Fordism**. **Fordism**'s defining image is a parking lot full of shiny new cars, assembled and waiting to be driven off the lot.

4CHAN (PRONOUNCED "FOUR CHAN") **4chan** is an Internet bulletin board where anyone can post anonymously. It was launched and initiated by Christopher Poole in 2003 and originally consisted of message boards largely devoted to posting images concerned with manga and anime. According to Amelia Tait, writing for the *New Statesman* in December 2016, the **Pizzagate** conspiracy theory ascended from the depths of **4chan** after an anonymous **4chan** user released an image of John Podesta and two girls eating pizza, which somehow, to believers, implicated him in human trafficking. This post followed the hacking of his emails and their release by WikiLeaks. Later on, a new batch of emails were released which convinced some 4channers that the word "pizza" was a code word for "children" as part of a paedophilic conspiracy involving a Washington D.C. pizzeria. The conspiracy theory moved from **4chan** to the Reddit message board, /r/The _Donald, and, from there, it was shared by a popular **Twitter** user @PizzaPartyBen. Its mainstream success was attributed to a YouTube video uploaded by the channel, EvilHillary, after which it was highlighted in the *Washington City Paper*.

FRONTAL LOBE(S) The **frontal lobes** are the most anterior, or rostral, part of the brain, and their evolutionary development was late in coming, accelerating in great apes and reaching their highest level of development in humans. In addition to the premotor and motor cortex, the **frontal lobes** contain the prefrontal cortex, which reaches its highest level of development in humans. The prefrontal cortex is important for intentionality, foresight, and planning. It plays and an essential role in forming goals and devising plans of action—sometimes referred to as "executive function"—to attain these goals. It structures the implementation of its actions according to a plan and organizes them in a correct temporal order. It then evaluates these actions as a success or failure. Importantly, it is critical for forming abstract representations as internal models which it is then capable of manipulating: our so called **working memory**, i.e., memories that are temporarily extracted from the brain's long-term **memory** in order to perform a particular mental task. The right hemisphere of the prefrontal cortex, according to Elkhonon Goldberg in *The New Executive Brain: **Frontal Lobes** in a Complex World* (2009), is essential for purposive mental actions that deviate from automatic routines. Such actions are involved in processes like creating **conceptual art**, navigating through uncertain environments using Situationist techniques, or choreographing sequential actions in a dance. The prefrontal cortex also plays a role in structuring future actions from the perspective of the present.

GANGLION CELLS **Ganglion cells** make up the inner surface of the **retina** and transmit information from the **retina** to the brain through the optic nerve. Two types of **ganglion cells** are important for us here: parvocellular (P) cells and magnocellular (M) cells. These are distinguished by their size, connectivity, and capacity. P-cells are important for fine spatial discrimination and color sensitivity, whereas M-cells respond to moving stimuli and contrast. These cells project to the lateral geniculate nucleus and the visual cortex differently, thereby creating two different pathways. It is widely accepted that **neurons** that account for motion are dominated by the M-cells and create processing pathways through to the parietal cortex, while color and form processing characteristic of the P channel carry forth to the inferotemporal cortex.

GENDER According to Judith Butler, in ***Gender*** *Trouble* (1990), the concept of **gender** is oppositional to that of sex: sex proposes that female (or male) identity is determined through the destiny of biology. If we believe that the scientific methodologies claiming this idea are politically neutral, female destiny is controlled by the vagaries of the X chromosome. The concept of **gender** replaces this dogma with an understanding that identity is culturally constructed and learned. Sex makes us male or female but **gender** designates us feminine or masculine. Theorists like Anne Fausto-Sterling, in "The Sex/Gender Perplex" (2000), notes that **gender** characteristics, unlike physical ones, are the products of socialization and experience. She states that "it was social institutions, themselves designed to perpetuate **gender** inequality, that produce most of the differences between male and female."

GENDERED BRAIN Many authors, following the writing of Catherine Malabou, accept that the material brain

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has **agency** and contributes to its own doing and making. Matter does not simply respond passively to its surroundings, but, often is generative and becomes a performative construct. (I use the term performative here in the way Judith Butler does in her negotiation of J.L Austin's, "How To Do Things with Words," (1962) to propose in her ***Gender*** *Trouble* (1990), that subjects are caught in a performative trap like agentless ventriloquists forced to recite the socially constructed speech acts that came before them.) Furthermore, as Bruce Wexler states in *Neuroplasticity, Culture and Society* (2011), human beings are the only organisms that can consciously, and unconsciously, alter their own habitat with the intention of changing their brains' architecture. Wexler was aware that there are two phases of neuronal development. First, there is an explosive genetically activated phase occurring outside the womb in which billions of neural elements are scheduled to multiply together at a moment called a "critical period." Subsequently, these **neurons** are pared down and sculpted by the outside world, creating an internalized neural homologue, or neural *bios*. Those elements that are most intensely and repeatedly stimulated by repeated interactions in the socio-political environment are preferentially selected for, and they go on to develop relations with similarly stimulated elements, forming the brain as an environmentally-remediated counterpart. **Emergence**, as well, plays a role here as those selected **neurons**, cognits, and networks interact in unforeseen ways producing *de novo* connections, but there is a second phase beginning at around the age of 16 and continuing forward into adulthood. The brain's **neural plasticity** begins to lessen, and the brain reverses the action of the sculpturing knife mentioned above, turning it outward, onto the environment itself. The brain – or, rather, populations of brains – start shaping the environment with the intent of shaping

itself. In other words, in the first instance, a gendered environment can be recapitulated in the resulting environmentally sculpted material brain reflecting the dominant gendered position, or, on the other hand, again following Wexler and Catherine Malabou, in her book, *What Should We Do With Our Brain?* (2008) human beings can alter their environment to change our own brain. We have the possibility, then, to create a brain that reflects **gender** inequalities or not depending on our political convictions and resolve. Therefore, the political systems that construct subjectivity, to the extent that they are malleable and under human control, also have the possibility of creating a representative feminist discourse that, in the end, could, hypothetically, produce a "feminist brain." Of course hegemonic patriarchal political systems can, as they have done for thousands of years, adjudicate a quite opposite system of neural architectonic relations.

GENE The definition of the **gene** has undergone many transformations since its original operational definition as the initiator of a process of encoding proteins and the phenotype that resulted. A **gene** is the functional unit of inheritance passed to offspring by parents. It is usually a section of DNA found on a chromosome and codes for transcription RNA, which is the first step in protein production. We now know however that RNA does more then simply produce proteins but its other forms such as micro RNA and small interfering RNA, have important regulatory functions. As John Quackenbush, of the Dana Farber Institute, states, in the article by Karen Hopkin entitled "The Evolving Definition of a Gene" (2009), With the discovery that nearly all of the genome is transcribed, the definition of a "gene" needs another revision: "To understand how the information in the genome plays out into phenotype, the crucial element is not what encodes protein, but what regulates the

complex interplay between the DNA sequence and the endpoint of phenotype." His implication being that it is not simply protein coding that effects phenotype but rather a whole array of processes that join protein coding such as epigenetic modification, alternative slicing and regulatory handiwork of non coding transcripts. Metaphorically speaking the genome can be seen as an archipelago of protein coding sequences in an ocean of non-coding transacted regulation. It is the regulations that explain the differences between simple and complex organisms and whether the DNA that codes this regulatory RNAs can be considered a **gene** or not is a matter of debate.

GENERAL INTELLECT The **general intellect** is a term coined by Karl Marx which describes the general social, cultural, and technical knowledge, or collective intelligence, shared by a society at a particular moment in time. In a passage from his unpublished writings given the title ***Grundrisse*** *der Kritik der politischen Ökonomie* (*The Fundamental Basis for a Critique of* ***Political Economy***) (published in 1939), known as the "Fragment on Machines" (or "Einige Fragmente über Maschinen"), Marx suggests that machines are the product of human industry and are the organs of the human brain created by the human hand. They represent "the so-called power of knowledge objectified." The ontogeny of fixed **capital** in its many forms is the physical instantiation of a similar and parallel process of occurring in general social knowledge which, on one hand, instigates those changes, and, on the other, becomes subsumed by them.

Paolo Virno reaffirms in his book *A Grammar of the* ***Multitude*** (2004), that in **post-Fordism**, the **general intellect** is the primary force of social production. Christian Marazzi, in ***Capital*** *and Language* (2008), argues that the **general intellect** is accumulated in

fixed **capital**, which makes work-time the measurable basis of value. In **post-Fordism**, the **general intellect** becomes fixed in the living labor of the workers' bodies, linked to what he calls their "the tool box of mental work." This transformation is further enunciated in **cognitive capitalism** in which the brain's hardware, meaning its **neurons** and **synapses**, and software, its dynamic oscillatory potentials, combine to become fixed **capital**. This goes beyond the Autonomist Marxist view of cognitive labor as the labor of language, communication, knowledge production, and data. This accords with the position of Antonio Negri, who states in *The Porcelain Workshop* (2008), that today's labor force has incorporated various elements of fixed **capital** in the brain's properties. This process, I am arguing, has consequences for thought itself and allows for a rereading of Virno's definition of the "**general intellect**" (found in the forward of the *Grammar of the **Multitude***): "**General intellect** should not necessarily mean the aggregate of the knowledge acquired by the species, but the faculty of thinking: potential as such, not its countless particular."

GESTALT The word **gestalt** equals configuration and was the invention of a group of psychologists referred to as the **gestalt** psychologists who pioneered research into the worlds' perceptual organization. Perceptual organization as defined by Vernon B. Mountcastle in his "Perceptual Neuroscience: The **Cerebral Cortex**" (1998) is the fundamental principle of "how it is that we effortlessly perceive a world in which parts or regions of the field are grouped together?" As Wolfgang Kohler, Max Wertheimer and Kurt Koffka understood, the perceived world is an emergent phenomenon and that any perceived scene is more than the sum of the sensations evoked by its individual parts. **Gestalt** psychologists generated a number of laws of perceptual organization like proximity, similarity, continuation, and common fate.

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GLOBAL NETWORK SOCIETIES According to Manuel Castells in *Communication Power* (2005), global network societies are made up of digital networks that have the capacity to reconfigure themselves beyond territorial and institutional boundaries. Social structures using such digital technologies also have the potential to be global. Not everyone is included in these digital networks, however, and some societies are deeply fragmented by what Castells calls "the double logic of inclusion and exclusion," or uneven globalization, which structures global networks and affects power relations.

GOOGLE EFFECT In their article "**Google Effects** on **Memory**: Cognitive Consequences of Having Information at Our Fingertips" (2011), Betsy Sparrow et al., define the "Google Effect" as the tendency to forget things we know we can Google. Their experiment, which was accomplished in four parts, revealed that subjects could retain either the location where a **memory** could be retrieved or its content.

Computers are part of our transactive **memory**. Transactive **memory** is a concept that grew out of theories of "group minds" in the mid-1980s and concerns how minds collectively encode, store, and retrieve knowledge. A "group mind" consists of each individual member of a group's memories plus each member's understanding of the other members' **memory** capacities, expertise, or knowledge domain which can be accessed when needed to solve a problem beyond an individual's own limits.

What Sparrow and her colleagues suggest is that Google is a kind of "uber" expert and provides a form of dynamic external **memory** storage which can be relied upon and which, therefore, makes expending energy to

memorize things unnecessary. Whatever the positive effects of this phenomenon, there are some negative ones as well: information learned on the Internet is retained less well than information obtained by reading a book, as shown through analysis of MRIs of the areas of the brain important for **memory** reconstruction.

GOOGLE FILTER BUBBLE Filter bubbles result from the combined history of an individual's searches on Google (and/or on social media platforms). Software agents monitoring such acts create personal profiles, which are then used by **algorithms** to guess what the user would like to view or experience next. Disagreeable information is sequestered to reflect user preferences, resulting in the isolation of the user in his or her own ideological or **cultural** bubble. Eli Pariser, who invented this term in his book, *The Filter Bubble: What the Internet Is Hiding from You* (2011), refers to such bubbles as "personal ecosystems of information." Data collected from personal online behavior and choices is sold to corporate entities and political strategy and consulting firms in order to customize the advertising and information fed to a user. Recent research and popular discussion have debated the relative power of filter bubbles to undermine civic discourse and make individuals more susceptible to propaganda and manipulation. The **Google filter bubble** is analogous to the notion of an "echo chamber" in which a person encounters only beliefs and opinions that coincide with their own and which further amplifies those opinions by repeating and circulating them.

GOVERNMENTALITY The term **governmentality**, coined by Michel Foucault, is formed by the combination of the words governing (Fr: *gouvernant*) and modes of thought (Fr: ***mentalité***). The idea of governing has two defining characteristics, according to Thomas Lemke, in "Foucault: Government and Critique" (2012). On the one hand, techniques of power are intimately connected with political rationality, and, on the other, they reach back to before the 18th century to definitions of governing which concerned the intricate guidance of the soul, management of children, and household—or, to put it plainly, conduct, or even the "conduct of conduct." According to Lemke:

> Government refers to more or less systematized, regulated and reflected modes of power (a 'technology') that go beyond the spontaneous exercise of power over others, following a specific form of reasoning (a 'rationality') which defines the telos of action or the adequate means to achieve it. Government then is 'the regulation of conduct by the more or less rational application of the appropriate technical means.'

GRUNDRISSE The ***Grundrisse*** *der Kritik der politischen Ökonomie, or The Fundamental Basis for a Critique of* ***Political Economy,*** occupies a pivotal place in Marx's *oeuvre*. It also offers a glimpse into his methods of work. Drafted during the winter of 1857-8, it consists of seven books in which Marx explores the major themes and theses that dominate his later writings, for example, his views on labor, **surplus value**, and profit, as well as providing insights into **alienation**, automation, the restrictions of personality, as well as offering a theory for conceptualizing recurrent economic crises. Toni Negri's lectures on the ***Grundrisse*** given at the École Normale Supérieure in Paris at the invitation of Louis Althusser in the early 1980s, mark the moment when the ***Grundrisse*** entered active theoretical discourse. (These were subsequently published as *Marx Beyond Marx*: Negri 1984).

HACKER (WHITE HAT) A white hat **hacker** is someone involved in "hacktivist" activities who manages to enter another person's, corporation, or government's digital property in order to access information contained within it, such as a local computer file, or an online account, in order to take down destructive messages or reveal evidence of criminal activity. Hiro Protagonist, in Neal Stephenson's *Snow Crash* (1992), embodies the mythos of the white hat **hacker** operating at the edge of monolithic **cultural** systems making crucial intercessions through technical skill, principled motivation, and carefree disregard for societal mores.

In the present context, hacking may be seen as a means of resistance, as in the case of actions by the group known as Anonymous. Established in 2003 on the image board **4chan** it is widely known for its cyberattacks and cyberpranks against many government institutions and police departments as well as ISIS and the Church of Scientology. Its leaderless and decentralized character make it difficult to prosecute. Anonymous members are known as Anons and can be recognized during public demonstrations wearing Guy Fawkes Masks. It can also be a means to repression, as in the case of the recent Russian hacks and distribution of John Podesta's emails. So-called "black hat **hackers**" may be involved in cybercrime, for example, breaching security platforms on corporate or military websites for money.

It is however McKenzie Wark, in his *A **Hacker** Manifesto* (2004), who proposes a much broader definition by stating that **hackers** are members of a class that "touches the virtual –and transforms the actual." According to him to qualify as a hack "the feat must be imbued with innovation, style and technical virtuosity." We normally think of a hack as concerned with data but in actuality it concerns abstractions and to abstract is accordingly the capacity to create a new plane upon which unrelated concepts, ideas and spheres of knowledge can interact

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in ways seemingly impossible in the past. It is through abstracting that **hackers** create new things that enter into the world. Recently the production of abstractions has accelerated and with it the rate at which exponentially emerging accelerating information forms. This has led to a third phase in the evolution of information as property and its transformation into intellectual property. There is a rub, and as in property and **capital** that emerged from differing regimes of the **political economy**, an attempt to monopolize information is being carried out by an owner class Wark refers to as the vectoralist class—the ruling class situated in our contemporary moment. In the past the ruling class shaped the military force whereas today it supplants this military industrial complex with the military entertainment complex where the surplus "is directed to the development of vectors of command, control and communication."

HEBBIANISM (formerly Hebbinism) **Hebbianism**, a word I coined in my essay, "**Neuropower**," published in the first volume of ***Psychopathologies of Cognitive Capitalism*** (2013), is named after the renowned Canadian neurobiologist, Donald O. Hebb, whose theory, known as "**Hebb's Postulate**," first described neural efficiency. As opposed to **Taylorism**, which used science and other empirical methods to maximize production, profit, and **surplus value** in the factories of industrial capitalism, **Hebbianism** elaborates the most efficient means to perform cognitive labor in order maximize **surplus value** in **cognitive capitalism**. In the 21st century, the mind and the brain predominate over the body as the dominant forms of value-producing labor. More and more of our jobs consist of **immaterial labor** carried out online and in collaboration with software. Scaled-up neural efficiency and **long-term potentiation** have become the entry points of **cognitive capitalism**, acting on the life of the cognitive laborer.

HEBB'S POSTULATE **Hebb's postulate** states the following: *when an axon of Cell A is close enough to excite Cell B, and repeatedly or persistently takes part in firing with it, some growth or metabolic change takes place in one or both cells such that Cell A's efficiency is increased*. Such a relationship has implications for learning, formations of **neural assemblies**, and the production of correlated activity.

HETERODOX CULTURAL SYNCHRONIZATION & ORTHODOX CULTURAL SYNCHRONIZATION In our post–political moment corporate inflected ***cultural*** landscapes operating in real world and virtual platforms are organized through elaborate "orthodox distributed attention networks" based on ***gestalt*** phenomena, fields of affordances, branding, re-targeting marketing, and social media optimization. According to Wolf Singer in "The Role of Synchrony Neocortical Processing and Synaptic Plasticity" (1994), the establishment of unambiguous relations between objects based on **gestalt** criteria and their subsequent **binding** of their relations is achieved through temporal synchronizations of their neuronal discharges. Building on Singer's research, Olaf Sporns, understands that entire repertoires of assembled and synchronized **synapses** that code for recurring object relations mentioned above, at times, experience long-term modifications resulting in neural plastic changes. As such, the distributions of objects and things (and their meaningful relations) have consequences for the synchronous coding patterns of dynamic networks in the brain. I am referring to this relationship between the institutionally sculpted object relations as they manifest extracranially and the intracranial responses they create orthodox or institutional culturally induced synchronicity with neural material consequences.

Artistic practices delinked from commercial enterprise, such as **noise** music and **improvisation**, create alternative perceptual, discursive, ecologies and networks of attention, that lay outside of orthodox regimes. These contingent practices focus on the unhinged and the unexpected and are referred to as "heterodoxic relations." Following Conrad. H. Waddington and James J. Gibson, one might say that these are alternative epigenetic landscapes composed of alien assemblages of tethered ***gestalts*** and affordances. When these models of otherness become stabilized, periodic, and repetitive, they have the capacity to form new assemblages of ***gestalts*** and affordances sometimes forming recognizable style characteristic of an artistic movement like Surrealism or Dadaism, which can then "catch the public's eye." Through repetition, emphasis, synchronization, and dissemination across multiple media platforms, heterodoxic phenomenological relations accumulate and begin to compete with institutional, normalized patterns. As such these artistic interventions induce synchronized responses of populations of **neurons** with neural plastic potential. In some cases estranged heterodoxic relations can outcompete institutional relations. This model of neural alterity constitutes the power of art to create new forms of neural architecture and the new forms of consciousness and unconsciousness they produce.

HETEROTOPIAS **Heterotopias** are real spaces that exist as possible places of infinite inversion and opposition. Michel Foucault defined **heterotopias** as "spaces of otherness."

HISTORICAL AND DIALECTIC MATERIALISM It can be argued that the architecture of the brain results in part from a dialectical and historical material becoming. I follow Michel Foucault's notion, developed in his *History of Sexuality Vol. 2* (1976/1984), that the body's anatomy and

physiology are important factors in its materialization, that deployments of power are directly connected to it. I agree with Karen Barad's analysis that the relations of the biological and historical are not consecutive events, but, rather, entangled and bound together. Furthermore, I am also in agreement with Barad's position that the body is not a passive agent, but, rather, an active performer.

Following the writings of Friedrich Engel's, especially in his *Dialectics of* ***Nature***, the brain's material changes reflect four different forces acting synchronously in the material world and brain: first, all things in **nature** are connected and change in response to phenomena that surround them. Secondly, **nature** is in constant motion; it is in a state of ongoing renewal and development. For instance, in the case of the brain, there are moments of tremendous growth of the neuronal population within the brain, especially during what are referred to as "critical periods". These occur in the visual cortex of human children between the ages of ten and twelve months, and are followed by periods of pruning and cell death of non-essential **neurons**, called "**apoptosis**". This neuronal exuberance and **apoptosis** indicates the sensitivity of this process to the conditions of the visual *milieu*; those conditions most important to the child and his or her teacher parent, will be registered as changes in the brain's materiality. Thirdly, these changes are not accidental, but are the result of an **accumulation** that gathers power. Fourthly, the method of historical and material dialectics unleashes the contradictions inherent in **nature**. Development is not an harmonious unfolding but rather a disclosure of incompatible and paradoxical unfoldings.

As Engels suggested, **nature**'s processes are not metaphysical, but material, and the processes of historical and dialectical **materialism** sketch out a real history of physical changes. The brain is both intracranial and extracranial as well; networks in the

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world and socio-cultural-political *milieu* are reflected as network configurations in the brain. This is the result of the combined efforts of epigenesis upon the mutable and plastic brain. One must also consider the generational and trans-generational changes taking place, including, for example, the mutating presentation of **cultural memory** upon the skin of architecture and its tectonics, and the consensual and co-evolving changes taking place in the intracranial brain. The **neuronal recycling hypothesis** is one example of this process in which the **accumulation** of textual material in the **cultural** milieu gradually impressed itself upon the plastic and material brain in the end transforming an area of the brain specialized for reading. The transition from the reptilian brain to the simian brain, and, now, the hominid brain is another illustration.

Engels surmised, invoking Darwin, that the development of life is a process that has taken millions of years and considerable destruction of forms. With this in mind, we can adapt the theories of Gerald Edelman who intuitively understood that the brain's capacity for change, and its coupling to the environment has been constituted by a process analogous to Darwin's idea of natural selection. Edelman called this the "Theory of Neuronal Group Selection". Reflecting the ideas of Catherine Malabou, accepting that the brain is in a constant state of change—in the here-and-now, as well as in the past and future—its neuronal groups were, and will be, selected in a Darwinian way by means of the brain's relation to a man-made environment (itself constantly in the process of metamorphosis). We have, therefore, the capacity to change the brain by changing the built and designed environment. If we only knew we had the power to do it! A final point on this topic: it is within this theory of dialectical and historical **materialism** of the brain that we find the power of art and architecture. Individuals or groups

of people have the power to change and complexify the very conditions of their world, a process through which they can create an analogously complex neural architectonics with tremendous repercussions for the development and evolution of thought. This is the emancipatory quality of **neuropower**.

HYPERREAL According to Jean Baudrillard in *Simulations* (1983) the **hyperreal** is linked to simulation. The **hyperreal** is the result of a crisis of the referential when the real is generated by models that have no origin or connection to reality. As he states, "The Territory no longer precedes that map, nor survives it. Henceforth it is the map that precedes the territory."(Baudrillard 1983) Furthermore something has disappeared. The difference that defined the **poetry** of the map and the charm of the territory and their co-extensivity has dissipated and replaced by a totally operational system that is generative and respects no truth. In fact the imaginary has disappeared altogether and replaced by the ether of the **hyperreal**.

HYSTERICAL SUBLIME The **hysterical sublime** is an idea conceived by Fredric Jameson in *Postmodernism, or, the **Cultural** Logic of Late Capitalism* (1991). He formulates a new definition of the sublime, one no longer based on our relationship to **nature** in its sheer power and incommensurability, as the term "sublime" was originally understood by Immanuel Kant, Edmund Burke, and others. Rather, the **hysterical sublime** responds to the eclipse of **nature** by technology. This corresponds to forms of derealization operating in the late multinational capitalism of the Third Machine Age.

A decentered global world often beyond the capacity of the mind to comprehend and cognitively map is what confronts the modernist subject. Key to his idea of the **hysterical sublime** is the idea of **cognitive mapping**, a term drawn from Kevin Lynch. In his study of the city, *The Image of the City* (1960) Lynch refers to the mental maps each urban citizen carries around in his head of the city as cognitive maps, and which Jameson expands upon, using Althusserian logics of ideology, to find the roots of this new sublime as the unrepresentable imaginary social and global totality. It is this incapacity to map socially the entirety of the burgeoning global and social conditions brought on by post-Modernism that he finds crippling to the productive subjective phenomenological understanding of political experience.

IMMATERIAL LABOR Although Maurizio Lazzarato and Antonio Negri first coined the term "**immaterial labor**" in their 1991 article, "Travail immatériel et subjectivité," for the purposes of this glossary, I adapt the definition put forth by Michael Hardt and Antonio Negri in their book, ***Multitude**: War and Democracy in the Age of **Empire*** (2004). **Immaterial labor** produces immaterial products such as knowledge and information. Additionally, it includes products that have not historically been within the domain of industrialized production, such as affective and emotional responses and beliefs. Importantly, **immaterial labor** has the power to produce new subjectivities, new enunciations, and new social relations. It is, therefore, not limited to the economy, but becomes a social, political, and **cultural** force. Ian Bogost discusses our increasingly mythological relationship with software in his article, "The Cathedral of Computation" (2015), in which he states that our "algorithmic culture is not a material phenomenon so much as a devotional one." Life-time and work-time become blurred; in other words, **formal subsumption** becomes **real subsumption**.

In *The Grammar of the **Multitude*** (2001), Paolo Virno writes that **immaterial labor** is performative and doesn't leave a trace. For the purposes of this

glossary, I contend that it does, in fact, leave residues in the neural material body, the peripheral and **central nervous system**s, and the sympathetic and parasympathetic nervous systems. This occurs through the actions of the brain's **neural plasticity**. **Immaterial labor** leaves material traces as memories embedded in synaptic efficiencies.

IMPROVISATION **Improvisation** is a form of performance accomplished "off the cuff" without (or with only rudimentary) advanced planning. Improvisers respond to their immediate environment, which includes fellow musicians and the listening audience, many times expressing their feelings at the moment of performing. It is an important quality of labor as it transitions from *praxis* to *poiesis*. **Improvisation**, **noise**, and ***duende*** represent artistic forms of temporal resistance of the **multitude**, acting against musicality and resonance.

INFORMATION ECONOMY Key to understanding the concept of the **information economy** is the point Rosi Braidotti makes in her video-taped lecture "Posthuman, All Too Human" at Durham University in January 2017: that advanced capitalism is cognitive and invests in the knowledge and control of all that lives. Genetic codes of living matter itself are themselves transposed into data and stored in networked data banks that form "biogenetic neural mediatic information systems" serving as **circulatory capital** about individuals and populations of individuals. This information is then subjected to different forms of risk analysis and speculation essentially reducing bodies and brains to informational substructure that in the end can be bought and sold. This mediated life form displaces human life itself. In its Post-Anthropocentric manifestation capitalism is not only interested in human data but animal data as well. The robotic industry is cloning not just the anthropomorphic body but also the best of the animal kingdom to take advantage of its most advanced forms such as the sonar capacities of bats and dolphins.

The **information economy** is crucially related to the future. First what Mark Fisher, in his essay "SF **Capital**" published in *Themepark* Magazine in 2000, calls SF **capital**; the positive feedback link between media and **capital** so called cybernetic futurism. According to Kodwo Eshun, commenting on Mark Fisher in his essay "Further Considerations on **Afrofuturism**" (2003), information about the future is a direct generator of economic value. Science fiction "preprograms the present" and "virtual futures generate **capital**."

Secondly, we are evolving towards total **neural subsumption** in the age of the **Statisticon** and the **singularity**. Data will be harvested not indirectly from our search choices on Google as today but directly from the process of thinking itself registered moment by moment by specialized brain wave detecting apparatuses. As a result of improvements in such technologies as **brain-computer-interfaces** and cortical implants eventually the brain's **agency** will be linked to the Internet. Companies like Neuralink, **Facebook**, Kernal, and DARPA are already investigating this future with varied success. The major drawback so far in creating such technologies, brain links to on-line platforms, is that the interface between the brain and the World Wide Web and **VR** still depend upon low resolution EEG–like devices. Today companies like BrainCo are adopting various technologies to harness the capacities of three types of brain waves such as alpha, beta and theta waves in order to maximize the potential of telemetric **brain-computer-interfaces**.

INFOTAINMENT **Infotainment** describes an emergent phenomenon of late 20th century capitalism: a moment when news became more about entertainment than the

unbiased and neutral reporting of facts. It represents the culmination of three trends. First, the capitalization of the sensationalist and emotional components of news; news became big business as a result. Second, the **24/7** news cycle began to demand tremendous quantities of stories to fill news diaries. Finally, celebrity reporting and human-interest stories, such as the O.J. Simpson trial, created "soft news" that gradually leaked into serious news programming, eventually subsuming it altogether. Fake news and infotainment are closely aligned in the subjugation and subjectivation of the cognitariat.

INSTAGRAM **Instagram** is a mobile app, owned by **Facebook** since 2012, used for sharing experiences and passions, *via* pictures and videos, to a group of public or private, pre-approved followers who create one's community. The platform remains open to abuse, however, as when trolls trawled the **Instagram** account of James Alefantis, the owner of Comet Ping Pong Pizza in Washington D.C. (@Jimmycomet), to find steamy images that would confirm their distorted theories concerning his role in the **Pizzagate** conspiracy.

INSTITUTIONAL DEPRIVATION **Institutional deprivation** refers to the conditions, originally found in some overcrowded Romanian orphanages, but now understood to be a worldwide problem, in which children have received impoverished stimulation. In comparison to children brought up in more engaged environments, these state-deprived children have reduced activity in various brain structures, including the orbital prefrontal cortex, amygdala, hippocampus, temporal lobe, and brain stem. Especially significant are the reduced and less-developed levels of white matter. These neural abnormalities are associated with delays in cognitive and social development such as emotional and linguistic deficits. **Environmental enrichment** is the effectual opposite of **institutional deprivation**.

INTENSIVE According to Manuel DeLanda in *Space: Extensive and Intensive, Actual and Virtual* (2005), **intensive** spaces and quantities—as opposed to ***extensive* spaces** and quantities—do not have boundaries, are indivisible, and are not additive. They are, instead, based on gradients that create flows—like those that occur due to osmotic pressure differences, for example—which, in the end, cancel each other out to produce equilibria. In some ways, all extensive entities have some component of intensivity in order to produce **variation** and change.

INTERNALIZATION **Internalization** refers to the internal reconstruction of an external operation. Lev Vygotsky, in his essay, "Genesis of the Higher Mental Functions," calls this process "mediated cognition," which refers to his assumption that mental activity is arbitrated by culturally-derived sign systems. He states that "The child begins to practice with respect to himself the same forms of [linguistic] behavior that others formerly practiced with respect to him," and, thus, the individual, through interaction with others, recreates externally perceived, shared social operations on the internal plane (Vygotsky 1931/1981). Vygotsky distinguishes his view from Piaget's, for whom we begin with ourselves before grasping the external world (including the social world), and Vygotsky sees the opposition between their positions as replicating the opposition between Spinoza's 'social brain' thesis and the Cartesian *cogito* (see Wolfe 2010).

INTERNET OF EVERYTHING (IoE) The **Internet of Everything** is related to the **Internet of things (IoT)** and builds upon it. Beyond accessing information from the cloud, the IoE also links people, processes, and data. In my definition, two other elements distinguish these ideas. First, in the

IoE, personal computing devices are no longer necessary to surf the web. Instead, direct interaction with smart devices, design, architecture, and cities generates data that enter the cloud and become available for use. The second distinguishing feature of the IoE is the ever-increasing importance of cognitive labor in interacting with these "smart" conditions through telepathic devices such as **brain-computer-interfaces**, wireless telepathic headsets like the EMOTIV EPOC, and, in the future, designed cortical implants. When the brain and the mind are seamlessly connected with the IoE, **big data** and predictive **algorithms**, a condition referred to as "the **Statisticon**" will be realized. The **Statisticon** is also related to the **Singularity**, characterized by the moment when human and machine intelligence merge. This **singularity** causes **real subsumption**, characterized by the expansion of work into life itself, to transition into to **neural subsumption** in which all thought conscious, unconscious and non-conscious is monitored and put to work. Cognitive labor itself becomes totally subsumed.

INTERNET OF THINGS (IoT) The **Internet of things (IoT)** is an ever-expanding condition of our postindustrial society. Some experts predict that by the year 2020, approximately one hundred million things will be connected through Wi-Fi interactions with the Internet/cloud. Besides its beneficial effects, such as smart and sustainable buildings and cities, the IoT also has many negative consequences. These include data security breaches and cyber-hacking threats potentially affecting things like airplane engines and pacemakers.

INTERSECTIONALITY **Intersectionality** is a term that delineates the ways and means through which power, as an interlocking assemblage of apparatuses, oppresses the most marginalized members of society in distinct ways. Importantly, it proposes that various forms of social stratification like race, gender, class, age, religion and disability, just to name a few, cannot be viewed as single and isolated conditions, but rather must be understood in their systemic context; as interlocking components in which their interactions are co-determinate. In discussing the marginalization and exclusion of Black women from feminist theory, and antiracist policy discourse, Kimberlé Crenshaw, in her foundational article, "Demarginalizing the Intersection of Race and Sex: A Black Feminist Critique of Antidiscrimination Doctrine, Feminist Theory and Antiracist Politics" (1989), states that this omission is based on the inaccurate reflection of these two discursive practices as isolated from each other. She rightly notes that they must be evaluated together because "intersectional experience is greater than the sum of racism and sexism," and any analysis "that does not take **intersectionality** into account cannot sufficiently address the particular manner in which Black woman are subordinated."

JUNKSPACE **Junkspace** is a term coined by Rem Koolhaas in his article of the same name to refer to Modernism's fallout or what "coagulates while modernization is in progress." Furthermore, although it appears to be its fallout it is in fact its core determinant. Koolhaas goes on to say that it is the "body double of space, a territory of impaired vision…it is beyond measure…it cannot be remembered. The relationship between **Junkspace** and what Mark Fisher in his book *The Weird and Eerie* describes as weird is unmistakable. For instance, Koolhaas' rant about **junkspace** as an encounter between escalator and air-conditioning conceived in the incubator of sheetrock echoes Fisher's concept of weirdness as the appearance of that which should not belong together as found in many Dadaist and Surrealist techniques. But it is the power of **Junkspace** to bubble up out of obscurity to become the essence of

the thing itself as its exterior materialization, as something explicit that was formerly implicit. And Koolhaas knows this; his call to the artist hand as an agential force to make this happen is an understanding of how randomness, chance and **noise** conspire together in great networks of aberration which force themselves through unconscious plays of forms and the formless, as understood by Georges Bataille, into our design vocabulary or in installations of things, mutating the conditions of space and time.

KEK **Kek** or the Cult of **Kek** is a satirical religion based on the worship of the Egyptian deity of darkness and chaos named **Kek**, from the ancient Egyptian Ogdoad cosmogony. It has re-entered popular discourse thanks to the deity's similarity to **Pepe the Frog**, an image often associated with the personage of Donald Trump. Depictions of **Pepe the Frog** use meme magic to influence the world by fulfilling the prophecy of online posts ending in a repeating number, especially the number 7. The symbol of **Pepe the Frog** has been associated with white nationalism, and to this day, has its own **Facebook** page. **Pepe the Frog memes** first developed tenacity during the 2016 presidential election, appearing on **4chan** in 2015 and subsequently on Reddit. **Kek** cult members claim that Pepe was partially responsible for the election of Donald Trump. In the estimation of Politico Magazine, the **memes** created by pro-Trump Internet battalions ultimately achieved a level of iconography and influence as powerful as Barack Obama's "Hope" poster. These groups also created and distributed sensationalized, tawdry accusations against Hillary Clinton, most notably, regarding her poor health and her involvement with the **Fake News** story called "**Pizzagate**." Their real world importance was demonstrated by Hillary Clinton's August 2017 speech against the **alt-right** and the characterization of **Pepe the Frog** as a hate symbol by the Anti-Defamation League.

LATE CC or LATE COGNITIVE CAPITALISM **Late CC or 'late cognitive capitalism'** marks its neural or cognitive turn. It is described by three tenets. First is the term **neuropower**, which is an extension of the word **biopower**, and refers to the action of power upon the neurobiological substrate of populations of brains which it attempts to normalize, synchronize and commodify. **Hebbianism**, the second principle, concerns the transition of the regulation and optimization of the body of the **proletariat** in **Fordism** to the regulation and optimization of the individual neural synaptic junction and their combined actions in the cognitariat. Thirdly is the rostralization of the brain and the additional importance accrued to frontal and prefrontal cortex in the evolution of man and higher primates. The capacities of the prefrontal cortex such as its **working memory**, prediction and attention are essential attributes of the **cognitariat** in neoliberal global capitalism.

LIVE-WIRED BRAIN The term **live-wired brain** refers to the fact that the human brain is born relatively unfinished, and it is the environment that over the ensuing years sculpts the brain. In comparison to other animals, like the dolphin that can swim at birth, or the giraffe that can stand and walk after a few hours, the human being is relatively helpless.

According to Terrence Deacon, "prefrontal overdevelopment has made us all *idiots savants* of language and symbolic learning." (Deacon 1997). According to David Eagleman, in his book, *The Brain: The Story of You* (Eagleman 2015), these precocious abilities might seem an advantage, but, in actuality, what is gained comes at the expense of **flexibility**. The nervous systems of these animals are pre-programmed, and

their physical bodies and abilities are linked into a corporeal-environmental network, part of what Richard Dawkins has referred to as an "extended phenotype." We might even call this a crystallized extended phenotype noting its *a priori* relation to the environment, which unfolds with the birth of the animal in the context of a pre-specified environment. Human brains are not pre-arranged or hardwired in these ways, and, as such, can survive in many different and unexpected environments, which are social and semiotic, forming ideologies and social structures. This is an advantage, and allows human beings to be able to adapt to many different kinds of environments, as well as the capacity to resist various denotations and connotations. I would like to refer to this relationship as a "virtual extended phenotype" in the sense of how Gilles Deleuze uses the term 'virtual' to mean something that is generative and full of potential that becomes actualized in the course of interacting with the environment (Deleuze 2002).

LONG-TERM POTENTIATION (LTP) As opposed to short-term **memory**, long term **memory** or what is referred to as **"long-term potentiation" (LTP)**, is defined by the persistent potentiation of synaptic excitability and enhanced transmission resulting from synchronous, intense, and repeated stimulation of converging neural excitations over a period of days or weeks.

Commenting on long-term memories in the snail Aplysia, Eric R. Kandel, in his book, *Reductionism in Art and Brain Science, Bridging The Two Cultures* (2016), describes the difference of short-term and long-term **memory**. In short-term **memory**, a single shock to the snail's tail activates modulatory cells that release serotonin and result in a transient strengthening between sensory and motor **neurons** leading to a withdrawal response. When, instead of a single shock, repeated shocks to its tail are paired with the firing of the sensory **neuron** in an associative learning paradigm, a signal is sent to the nucleus where the **gene** CREB-1 is activated resulting in the growth of new connections. Kandel writes "[t]hese connections are what enable a **memory** to persist." These events, when repeated millions of times all over the brain, have consequences for its architecture. It is these long-term memories that form the **archive** of memories used, for instance, in the process of **working memory**. In **cognitive capitalism**, the **archive** of memories, from which the theater of the mind is constructed, is the new site of normalization and governmentalization. The **archive** of memories, like the **archive** described by Michel Foucault in *The Archeology of Knowledge,* "defines at the outset the system of its enunciability."

MACHINIC INTELLIGENCE **Machinic intelligence** defines the relationship of abstract labor to the rationality of the machine in industrial labor. In such labor, the worker is tethered to a position of (embodied) space and time along a conveyor belt or assembly line. The worker's mental operations and physical actions are dictated by that position in the production process and tethered to the intelligence designed into the machine. One must remember that as labor shifts from the concrete (the handmade) to the abstract (industrial production), each fractionated task becomes interchangeable, as noted by Adam Smith in *The Wealth of Nations* (1776). In cybernetic and cognitive labor, according to Romano Alquati in his article, "Struggle at FIATt" (1964), these operations are pulverized, fractalized, and, I would like to suggest, today assembled inside a networked "cloud." The assembly line has been substituted for the algorithmic **apparatus**, which now assigns human beings tasks.

The linear and analog instructions characteristic of **Fordism** are now distributed, and network-like in our

increasingly Internet-based society. The networked brain is now a model for what is referred to as the "**Connectome**."

MASS INTELLECTUALITY **Mass intellectuality**, according to Maurizio Lazzarato in his essay, "**Immaterial Labor**" (1996), is a result of **immaterial labor** itself. It refers to intellectual competencies that were formerly seen as strictly bourgeois activities, such as determining artistic standards, fashion, taste, consumer norms, and forming public opinion. These competencies are now redistributed throughout the entire social labor force. As such, **mass intellectuality** has nothing to do with a new labor aristocracy, according to Paolo Virno in his essay, "**General Intellect**" (2001), but is its opposite. Furthermore, **mass intellectuality** does not merely concern forms of knowledge valorized by **capital**; it also refers to this knowledge's immanent and prefigurative criticality, and the constructive potential for new forms of sociality.

MATERIAL ENGAGEMENT THEORY **Material engagement theory** is formulated by Lambros Malafouris in his paper, "The Brain-Artefact Interface (BAI): A challenge for archaeology and **cultural** neuroscience" (2010). Malafouris states that the material world is not abstractly represented by the brain, but is ontologically inseparable from it; it is consubstantial with the mind. Although it is possible for the brain to represent anything in the physical world (and things that are not), the power of material culture is synergistic with our cognitive systems and relieves the brain from having to do so. Real objects or computational devices—existing in the world in real time—can stand in for their imaginary counterparts and processes in various thought trajectories.

MATERIALISM I prefer to think of **materialism** as Catherine Malabou does in her essay, "Whither **Materialism**?

Althusser/ Darwin" in the book of collected essays *Plastic Materialities: Politics, Legality, and Metamorphosis in the work of Catherine Malabou* as **materialism** of the encounter and of **contingency** rather than a repressed **materialism** of ideology and telos. In this version form is what is produced in advance in order to produce an already known structure. Rather than accepting these limitations she would rather see matter as " what forms itself in producing the conditions of possibility of this formation itself." (Malabou 2015) To make her point she unpacks Darwin's' *Origin of Species* in the context of plasticity which for her forms the very core of his theory of evolution because it connects the natural variability of individuals of a species to natural selection. With some philosophic dexterity she delineates the way in which this variability represents a kind of void, formlessness and quasi-infinity with which regularities in the environment, be they natural or cultural, can sculpt. "The **materialism** of the encounter thus pertains to a natural process that assures the permanent selection and crystallization of **variations**." Unlike **nature** in which there is a blind and automatic equilibrium between identity and difference, which one might consider unconscious, the polis presupposed and predefined the criteria with which to guide the knife of repressive selection. This is especially true of **neural materialism** constituted by the 'theory of neural selection' developed by Gerald Edelman in his book of the same name except that the variability of traits expressed in the singular genome of members of the population is substituted for by a variability of neural substrate at birth called the **primary repertoire** and later, after the events of epigenesis, in the production of the **secondary repertoire**. Here the mechanisms of the regularities of the sensory and perceptual environment that make up the regulated and catalogued social impose themselves

in a manner similar to natural selection and survival of the fittest upon the variability of **neuron**al population producing normalized neuronal populations of repressed **materialism**.

MEMES **Memes**, according to Richard Dawkins in *The Selfish **Gene*** (1976), and Susan Blackmore in *The Meme Machine* (1999), are elements of culture that are passed between humans using non-genetic means, particularly imitation. They can be understood, metaphorically, as a form of virus that distributes **cultural** information instead of DNA. Especially relevant is Blackmore's theory of **memes** as co-conspirators in the production of our "oversized" brains, which are so large as to make birth itself perilous. Memetic action takes place in our brains, and **memes** use our brains to reproduce themselves. Blackmore intuits that as **cultural complexity** increases, so, too, does the vast bio-machinery of the brain necessary for **cultural** propagation and dissemination.

As Amelia Tait describes in her article "**Pizzagate**: How a **4Chan** conspiracy went mainstream" (2016), **memes** through a process called meme magic can be become entangled in conspiracy theories like **Pizzagate** and transcend the Internet to attain real life consequences. According to her article, "the election of Donald J. Trump was meme magic in action. 'We actually elected a meme as president'." (Tait 2016)

MEMORY **Memory** can be short-term or long-term, phyletic or individual, motor or perceptual. Short-term and long-term **memory** is distinguished by the following characteristics: temporal persistence (how long a **memory** is retained); information capacity (long-term **memory** seems to have a greater capacity); and, finally, cue sensitivity (in which long-term **memory** retrieval is facilitated by a specific cue). Short-term **memory** may be a gateway to long-term **memory** and may share

the same cortical substrate and networks. Phyletic **memory**, or the **memory** of the species, is contained in the basic architecture of the brain at birth. It consists of the accumulated **memory** of a species through evolution. In this sense, it differs from individual **memory**, which is the **memory** accumulated by an individual through experience. Phyletic **memory** is contained in the primary sensory and motor systems, whereas individual **memory** is mostly contained in the associative cortices of the brain; nevertheless, there is a constant, dynamic interaction between the two. Epigenesis is a more important feature of individual **memory**. Motor and perceptual memories are distinguished by their anatomical locations, with the former located in the frontal cortex, and the latter posterior to the central sulcus. Perceptual **memory** concerns knowledge of the self and the world as acquired through the senses, whereas motor **memory** is more procedural. Higher and more developed forms of motor **memory** are schematic and contain a temporal dimension.

In my essay, "Simulated **Memory** and the Wired Brain: The Emerging **Superordinate Precariat** in the Post-Pandemic Future», I distinguish three kinds of **memory** related to the three levels of the **simulacrum** described by Jean Baudrillard in his book *Simulacra and Simulation* (1981): Authentic, Prosthetic and Irreal. Authentic **memory** is related to first order simulation in which the copy stands in for the real object. It is a forgery of an original. Prosthetic **memory** is a product of the Industrial Revolution and the productions of copies. The prosthetic **memory** is not associated with an individual real experience. The engram laid down is the result of sensorial experience generated by photography, cinema and **virtual reality**. The second order is associated with the Industrial Revolution and marks the first moment when the relation between reality and representation begins to break down due to mass production of copies

and their subsequent commodification. This process of commodification threatens the authority of the original as the image/copy becomes an equal or even better placeholder for the real. Irreal is the product of the third order **simulacrum** in which the relations between the real and representation completely break down. The sign pretends to be an adequate copy but in actuality refers to no original.

MENTALITÉ ***Mentalité*** links the notion of governing to that of mental life or thought. According to Michel Foucault, it is impossible to understand apparatuses of power without an analysis of the political rationality underpinning them. This political rationality is internalized and forms an integral part of an individual's beliefs, judgments, and viewpoints. Foucault was influenced by '***mentalité*** history', which had moved away from studying institutions, social or economic structures, and sought to focus on 'mental categories', including worldviews (as in Carlo Ginzburg's famous *The Cheese and the Worms*, Ginzburg 1980). Today, this idea is also linked to the condition of the **cognitariat** and harnessed by the conditions of optimized **algorithms** in the production of **surplus value** in cognitive laboring.

MICROBIOME In their article "Gut Microbes and the Brain: Paradigm Shift in Neuroscience", Emeran A. Mayer et al. assemble a growing body of evidence of bidirectional signaling between the brain and the gut's **microbiome**. The **microbiome** must be differentiated from the microsome. The former represents the total population of microbes that live in our bodies (which can total more than a trillion). The latter describes their combined genetic material (which is two hundred times the size of the human genome).

According to the authors, experimental manipulation of the gut **microbiome** can **affect** emotional behavior and related brain regions. Recent findings have led to speculation that alterations in the gut **microbiome** may play a role in psychopathologies of the human brain such as depression and anxiety, as well as autism. (I understand autism from the perspective of a **neurodiversity** model as well as the medical model. Those closer to the **neurodiversity** model are calling for producing friendly environments in which individuals can thrive and those advocating for the medical model are hoping for a cure.)

THE MIND'S EYE **The mind's eye** refers to the **nature** of imaginary internal representations that underlie the experience of the visualization of images inside one's skull, especially when one closes one's eyes, (although it is possible to experience **the mind's eye** when one's eyes are open). This image inside the skull, or "visual mental image"—often referred to as "seeing with **the mind's eye**"—needs first to be distinguished from an image created by a real object or thing that is visually perceived. As Marlene Behrmann has noted in her article, "**The Mind's Eye** Mapped Onto the Brain's Matter" (2000), in the first case, the sets of representations occur in the absence of the appropriate sensory input, while, in the second case, it is the result of bottom-up mechanisms driven by the input from the eyes encountering real or virtual sensations, as well as the result of top-down mechanisms emanating from stored abstract memories. Stephen M. Kosslyn has suggested that both visual mental imagery and visual perception utilize similar parts of the brain particularly those located in the visual cortex area, V1, as well as the more anterior visual association cortices of the temporal and parietal lobe. In generating a visual mental image, the same areas of the brain utilized for visual perception are replayed, and mental imagery might be conceived of as a process running visual

perception backwards. Imaginary auditory and olfactory representations can also be experienced as part of envisioned complex scenarios and stories. Franco "Bifo" Berardi has drawn attention to a concept he refers to as "the minds' we," in which images are experienced by many people simultaneously listening to a story or, for example, the lyrics of a rock'n'roll ballad.

In **cognitive capitalism**, **the mind's eye** and *minds' we* are sites of governmentalization. What images we can internally imagine, and the scenarios we can visualize, are determined by the experiences we have had and the memories we have stored. Jacques Rancière, in *The Politics of Aesthetics*, describes the "distribution of the sensible," or "*le partage du sensible*," as the

> implicit law governing the sensible order that parcels out places and forms of participation in a common world by establishing the modes of perception within which they are inscribed.

Implicit refers to that which sovereignty—the entity, whether absolute or popular, local or global, that has jurisdiction over a territory or group of people—produces as a system of perceptual facts that are regulated, which, in turn, regulates its constituents as perceptual bodies. I am extending this concept by suggesting that in **cognitive capitalism** these perceptual facts are registered as short- and long-term memories, which are already selected at a primary level and then recalled as visual and auditory scenarios inside **the mind's eye** where they are then policed. This constitutes an additional tenet of **neuropower** in which instead of the power directly designing a normalizing sensorial array, it indirectly constitutes the long-term **memory archive** used by **the mind's eye** in the process of internalized visualization.

MIRROR-NEURON SYSTEM The **mirror-neuron system** is a cortical system in the brains of monkeys and other primates, including humans. According to Giacomo Rizzolatti et al. in "The Mirror System in Humans" (2002), mirror **neurons** are a specific class of visuomotor **neurons** originally discovered in the ventral premotor cortex (area F5), but, recently, also in the parietal lobe (area PF), to which the F5 is reciprocally connected. A mirror **neuron** becomes active both when the monkey in the experiment performs a particular action, and when it observes another monkey performing that action, suggesting that action observation involves a mapping of others' actions onto the observer's own motor system. It does not become active when observing another monkey mimicking an action, or simply observing an object, even if the monkey is interested in that object.

MOORE'S LAW **Moore's Law** is named after Gordon Moore, the CEO of Intel who in 1965 noticed that transistors were shrinking every year and that more and more could fit on to a chip. His original description explained that the number of components per integrated circuits or CPU doubled each year. This translated into proposing that overall processing power and speed would, as a result, also double; although a graph describing the slope of the speed is less accurate than the number of transistors. This value has been revised a few times to accommodate the increasing speed and efficiency of transistors. It rests today at about 18 months. Many believe given the current technology that **Moore's Law** will reach its limit although, as we can surmise from the history of chip technology in which other bottle necks have been overcome, such as the transitions from vacuum tubes to transistors to integrated circuits to Very Large Scale Integrated circuits (VLSI), new improvements may be just around the corner.

MORPHOGENESIS **Morphogenesis**, or the genesis of form, is a developmental process that takes place during gastrulation when the fertilized egg is connected to the placenta and begins to form the three layers of the embryo: the endoderm, ectoderm, and mesoderm. It concerns how the organism develops its shape. In 1934, Julian Huxley and Gavin de Beer, in their book, *Elements of Experimental Embryology*, combined two theories to explain **morphogenesis**. The first idea is that an organism produces a chemical that diffuses through the cellular matrix according to a gradient. The second idea is that these chemicals turn on genes that make proteins and produce structures. Problems with **morphogenesis** can lead to embryonic malformations like **teratomas**. In my essay, "The **Brain Without Organs**, **Ayahuasca** and the Theory of **Neural Regression**" I propose that **morphogenesis** is crucial to understanding Gilles Deleuze and Félix Guattari's concept of the "**Body without Organs**," as the full egg before the extension of the organism and the organization of its organs, or, in other words, before the period of gastrulation during which **intensive** flows produce extensive, regulated, and circumscribed organs.

MULTITUDE According to Michael Hardt and Antonio Negri in their book, ***Multitude**: War and Democracy in the Age of **Empire*** (2004), the **multitude** differs from "**the people**" because while **the people** can be ruled, the **multitude** cannot. By **the people** they mean a unitary conception, which is the result of reduction of the inherent difference contained in any population into a single identity. "'**The people**' is one." The **multitude**, on the other hand, is the many and is composed of

> innumerable internal differences that can never be reduced to a unity or a single identity—different cultures, races, ethnicities, genders, and sexual orientations; different forms of labor; different ways of living; different views of the world; and different desires.

The **multitude** resists dominant systems because it is made up of singularities that can't be reduced to sameness; each one manifests a unique form of resistance. This is sometimes seen as a weakness because—it is argued—the **multitude** cannot act as a collective form of resistance. The **multitude** is distinct from the crowd, the masses, and the mob, none of which can act of their own accord in Hardt and Negri's understanding. It designates an active social subject that is not unified. Instead, it is a heterogeneous social assemblage of difference-in-time, mobilized intermittently by commonality. For Hardt and Negri, commonality does not signify the destruction of pre-capitalist shared space by enclosure, but, rather, relates to our shared communication network as a central component of social production for which they give the name 'the common' in opposition to '**the commons**.'

A distributed network, like the Internet, is a good model for the **multitude** because it is made up of self-similar **nodes** that are different, yet connected, with external boundaries that are open and subject to modification. This is why, according to Hardt and Negri, the **multitude** is the only social subject capable of realizing democracy: the rule of everyone by everyone. **Neural assemblies** operating in a network are also multitudinous and mimic certain aspects of the World Wide Web and might be an interesting metaphor with which to express new forms of democracy. I am not suggesting that neuroscientific theories might be a means by which we might understand how social political systems are constructed, or are the cause of such conditions, rather, what I am saying is that similar social, political, economic, psycho-mental and neurocognitive relations

require similar models through which to understand their means of operation and production in **cognitive capitalism**. Understanding networks are crucial for all models. For instance, according to Olaf Sporns in *Networks of the Brain* (2010), **neuron**al hubs mimic popular sites of the World Wide Web. Important for the idea of the **multitude**, as it relates to the brain, are the concepts of functional segregation and integration. Key here is that local networks are constituted by diverse, and highly differentiated, discrete anatomical units and states of specialization, which are linked and unified or bound across the brain by long-range connections, some of which are reentrant. The seamlessness of consciousness or its experience as a unified mental state—it does not appear as chopped up into bits as William James famously said—is the result of integration of highly differentiated states on a fast time scale. These highly differentiated states can be thought of as a neural **multitude**, which are transiently bound together in time according to the continually varying and changing socio-**cultural** *milieu* with which the intracranial brain in entangled. It is important that the concepts of '**Empire**' and '**multitude**' are interlinked, as both extend across the globe, one as a notion of rule or control, the other as a notion of resistance, as Charles Wolfe notes in his discussion of the notion of **multitude** (Wolfe 2010).

NATURE **Nature** comes from the Latin *natura*, meaning "innate dispositions," "essentially qualities," also, "birth": the term refers to a range of concepts including the physical and geological environment, the biosphere, or the fundamental qualities of a person, social structure, or territory. **Nature** has been conceptualized in numerous intellectual schemas ranging from animistic religions, romantic conceptions of the sublime, and materialist scientific research. Currently, the question of where

nature and human activity begin and end is increasingly foregrounded as the advance of human-induced climate change becomes more integrated within planetary feedback systems, giving rise to the notion of the "**Anthropocene**," a geological epoch in which human influence has become a significant factor in the structural systems of the earth.

Jedediah Purdy, in his book, *After **Nature**: A Politics of the **Anthropocene*** (2015), interprets ***nature*** through its relationship to the environmental imagination. Four versions of this imagination are crucial to the ways in which we channel our energies socially and politically to shape **nature**. They are:

1
A providential vision in which **nature** serves Humanity.

2
A romantic vision in which its value is aesthetic and spiritual.

3
A utilitarian picture in which **nature** is a storehouse of resources that require careful management.

4
An ecological view in which humanity and **nature** are interlocked in a complex system of relations.

In his article "Ecology Without **Nature**" (2010), Timothy Morton anticipates his books *The Ecological Thought* (2012) and *Hyperobjects: Philosophy and Ecology after the End of the World* (2013) to understand **nature** as a terminology that is useless because the distinctions between what it is and what it is not have been

undermined by science. "**Nature** becomes useless as a concept. Modernity has been the story of how science has undermined a stable, rigid concept of **Nature**, precisely because it has shown how boundaries between life and nonlife, and furthermore between sentience and nonsentience, are not thin or rigid enough to produce distinctions that count beings as Natural or non-Natural." Recalling Darwin he furthermore states that there are rigid boundaries between a species, a variant and a monstrosity. **Nature** is understood on a human scale which makes it impossible for it to be understood in its multi-scale, multi-temporal and multi-variant capacity.

NEGENTROPY The word "**negentropy**" was coined by Léon Brillouin but made famous by Norbert Wiener in his explanation of information as the negation of entropy. As such, it was to mean those conditions that negated disorder or the negation of everything contingent or unpredictable. Entropy thus became linked to definitions of **noise** as a measure of variability or imprecision. For Wiener information is a measure of increased constraint. As Cecile Malaspina noted in her *An Epistemology of **Noise***: " by emphasizing the negation of **contingency** our idea of information has become tethered to predictability and consequently antithetical to **noise** as the unpredictable" (Malaspina, 2018). Opposed to this notion of **noise** and information is that proposed by Claude E. Shannon and Warren Weaver in their 1964 book, *The Mathematical Theory of Communication.* Malaspina summarizes their argument, drawing attention to the distinction they make between information entropy that generates freedom of choice and knowledge and that of **noise** entropy that is spurious and requires negation.

NETWORK MODEL OF BRAIN FUNCTION The modular model of brain function precedes the network model and harks back to the 19th century and the work of neuroanatomists who were able to divide the **cerebral cortex** into structural regions based on its cytoarchitecture. It understands brain function as the result of the interactions of **neurons** living and operating within localized regions each with its own specified function. The visual cortex is a case in point. Visual stimuli arriving from the **retina** of the eye is processed separately according to its specialized attributes such as color, movement, shape and form. According to Giulo Tononi et al. in their "**Complexity** and coherency: integrating information in the brain" (1998), although the evidence for specialization is overwhelming, it is clear that this information must be integrated to guide adaptive behavior at the root of our cognitive abilities. According to them this question of a holistic versus localizationist view of brain function underlies one of the oldest controversies of neuroscience. For instance, the aforementioned processing of visually distinct attributes are further integrated by what is referred to as the two-stream hypothesis. The ventral stream integrates information from the visual cortex with the temporal lobe being important for object recognition and the dorsal stream ushers information from the visual cortex to the parietal cortex and is important for localizing objects in space. A recent theory of the modular structure of brain networks takes off from this earlier model but is based rather on the variable way that elements within the **nodes** are connected versus those between **nodes**. Those within the node are more compact and have many more structural and functional connections. The **network model of brain function** emphasizes the functional and structural connections between regions. It theorizes that cognitive representations lurk in widely distributed **neural**

assemblies of cortical **neurons** that are simultaneously excited in parallel by a stimulus. Brain networks operate on multiple spatial and temporal scales, and in this respect, mimic other complex systems like multi-scale arrangements of social networks. Akin to neural networks, which scale up from individual cells and **synapses** to macro-scale relations, necessary for consciousness and embodiment, social networks range from interpersonal relations, to cohesive social groups,, local communities and urban settlements, and to descriptions of national economies consisting of global political organizations. A **network model of brain function** *refutes* a reductionist model which understands brain function as strictly the consequence of events occurring at the synaptic and neuronal level. It emphasizes the importance of **emergence**.

Understanding the basic components of the network is important for grasping their importance in **cognitive capitalism**. (The definitions that follows can be found in much greater detail in Olaf Sporns' book *Networks of the Brain*, 2010.) A graph is a representation of a real world network or a system composed of interconnected elements. It is composed of **nodes** and edges. **Nodes** denote the fundamental elements of the system, like a group of people composing a social network. It is constituted as a coherent region on the basis of histological and imaging data. Edges represent its peripheral margins and are the sites of nodal interaction. In neural networks, **nodes** represent neural elements such as cells, populations of cells, and brain regions; edges constitute connections between **nodes** such as pathways. Hubs are sites of intense regulation of flows between **nodes**, and they facilitate nodal relations. The single most important indicator of a node's importance is its degree or "strength."

There are three main ways of characterizing networks: structural connectivity, functional connectivity, and effective connectivity. Structural connectivity, as the name implies, describes the basic physical architecture of the network, and is composed of various forms of anatomical connections such as local circuits of single cells to large-scale networks of interregional pathways. Although normally considered static, especially in short time scales; over large time scales, they can manifest slow dynamic behavior as registered during neural development in the womb, during **morphogenesis**, and neural tube formation, as well as the result of post-natal epigenetically-provoked neural sculpting. Functional connectivity describes dynamic coupling indicated by deviations from statistical independence of phase-locked neural communities. "Phase locking" refers to the synchronization of brain wave patterns that indicates a coordinated response to information such as musical consonance. Finally, effective connectivity describes consistent causal effects between networks built up over time and inferred through series analysis.

NETWORK MODEL OF LABOR In the late 1960s and early 1970s, the **network model of labor**, based on cybernetics, replaced that of the assembly line. This was accompanied by a massive restructuring of the telecommunications industry, and prompted a shift from a Fordist model of linear production on an assembly line to a post-Fordist model based on feedback and feed-forward pathways in a control system. Later, in response to the rise of **immaterial labor**, this model expanded even further to "**communicative capitalism**." According to Michael Hardt and Antonio Negri, in ***Multitude***, this new form of network-based production created a new set of possibilities for resistance.

NEURAL ASSEMBLIES In his (coauthored) review article entitled, "The Brainweb: Phase Synchronization and Large-Scale

Integration" (2001), Francisco Varela describes how **neural assemblies** are distributed neural networks that are transiently linked by reciprocal, dynamic connections at the local and global level. "Local" and "global" refer either to communication within a certain limited area like the primary visual cortex, or between different distinct and separated regions, as in top-down and **bottom-up processing** between the frontal cortex and the primary visual cortex. In some ways, these latter activities mimic the Internet, for, like the World Wide Web, highly differentiated and autonomous websites are transiently hyperlinked. As Varela notes, these assemblies are best described by their dynamic interactions rather than their individual activity. They may display oscillations that are in-phase (synchronous) or out-of-phase (asynchronous). Out-of-phase functional rhythms suppress the effect in the target network. As the name implies, synchronized oscillations occur when numerous integrated **neurons** spike together simultaneously. According to Wolf Singer, **binding**-by-synchrony may explain how spatially segregated **neurons** respond to the same stimulus to give coherence to perceptions and actions.

NEURAL CAPITALISM **Neural capitalism** is a specialized form of capitalism that concerns the incipient alliance between brain science, economics and infotech. It is the driving force of late stage neoliberal **cognitive capitalism** in which the material brain is the central focus of economic investment and speculation..

NEURAL COMMONS Like other commons, such as **nature** and language, the neural commons is under assault by corporate and military interests seeking to privatize, exploit, and subsume it. This phenomenon is similar to biopiracy, defined by Michael Hardt in his article, "Reclaim the Common in Communism" (2011), as "the

processes whereby transnational corporations expropriate the common in the form of indigenous knowledge or genetic information from plants, animals, and humans, usually through the use of patents." Thus, the brain's materiality and its capacities (like its neural plastic potential) are under the threat of being transformed into property in **cognitive capitalism**. First, in the form of pharmaceuticals such as those used in treating psychiatric diseases like depression and neurobehavioral disorders like Attention Deficit Disorder (ADD) which act on synaptic junctions. Secondly, a new form of governmentalization called "**neuropower**" which acts to normalize its neural **variation** and **neural plasticity**. DARPA's program called Targeted Neuroplasticity Training (TNT) is a case in point as it attempts to boost cerebral **neural plasticity** in hope of enhancing cognitive skills and **memory**. Thirdly, embedded **neural technologies** like **brain-computer-interfaces** and cortical implants have the capacity to transform and subsume the brain's static neural hardware, its **neurons**, axons and **dendrites**, as well as its dynamic neural dispositions, like its alpha and beta rhythms. DARPA's program entitled, Neural Engineering System Design (NESD), hopes to increase signal resolution and data transfer bandwidth in order to connect the brain to the Internet. The GPS and **Deep Learning**, which outsource once-intracranial operations into extra-cranial devices, are more easily controlled, and, as a consequence, also make the cognitive operations they replace null and void and subject to degeneration. In their article, "Acquiring 'the Knowledge' of London's Layout Drives Structural Brain Changes" (2011), Katherine Woollett and Eleanor A. Maguire show how black cab drivers who acquired "the Knowledge," an exam program detailing the streets of London over a four year study period, had considerable growth and development of their posterior hippocampus while those that did not manage to learn the routes did not. GPS makes

this kind of learning unnecessary, and, as a result, the consequent hippocampal changes do not develop.

NEURAL CORRELATES OF CONSCIOUSNESS (NCC)

The full spectrum of purported answers to questions concerning, "What is human consciousness?" have driven many types of discussion since René Descartes remarked in his *Discourse on Method* (1637), " je pense, donc je suis," or "I think, therefore I am." The central concern of most of these theories revolves around an inborn capacity for self-reflection, especially when it concerns the interpretation and reaction to various sensory stimuli (notably visual stimuli) called "qualia" and the feelings they engender. Descartes distinguished between physical substances or spirits inhabiting the nerves and muscles, called *res extensa* (extended things/objects), and thinking substance, which is limited, in his understanding, to humans and which gives rise to consciousness; he called this *res cogitans* (thinking thing/substance). This bipartite system formalizes the doctrine of "dualism" which, in other forms had previously appeared in the writings of Aristotle, Thomas Aquinas, and, later, returned in the writings of modern thinkers like Karl Popper, and the neurophysiologist John Eccles. Accompanying this philosophical tradition is that of the so-called "mysterian position," which claims the utter **complexity** of consciousness makes it sublime and beyond the human capacity for understanding. Daniel Dennett, in his book *Consciousness Explained* (1991), denies the existence of consciousness, instead proposing that it is an illusion perpetrated by the sensory and motor apparatuses in cahoots with social constructions and learning. The enactive or sensorimotor account of consciousness is somewhat related to the above theory, but comes to radically different conclusions. Yes, the nervous system cannot be considered in isolation, and through its reactions to, and relations with, the environment in one's lifetime, one acquires knowledge about the way it acts. These are then used in its future encounters with said environment. The enactive account, however, claims that neural activity is not sufficient for consciousness, and that it is the behaving, acting body, placed in an environment, that creates feelings. The opening this argument seems to leave exposed is an ontogenic one: interactions with the environment, over time, mold innate, biologically unfolding neural attributes—some of which might be implicit—which are used in future encounters, assuming that the environment is stable. Relevant to this position is Gerald Edelman's notion that the brain is not a computer, but a selectional system in which large numbers of variant circuits are generated epigenetically in which some circuits are intensified through improving synaptic efficiency while others are not; the residual neural population resulting therefrom is a reflection. Rounding out these theoretical accounts of consciousness is what Francis Crick and Christoph Koch provide in their book, *The Quest for Consciousness* (2004): an account of consciousness being the byproduct of emergent properties of certain biological systems. Especially relevant here are the conceptual differentiations developed by Gerald Edelman, and, recently, further elaborated by Antonio Damasio, in which consciousness is distinguished between purely sensory forms of awareness and "core consciousness," which concerns the here-and-now, as well as extended consciousness, which requires a sense of self and can appreciate the past and future. Edelman, in his article "Naturalizing consciousness: A Theoretical Framework" (2003), calls these two form of consciousness "primary consciousness," or the "species present," in which a scene is constructed with perceptual and motor sensory information and then collaged together with memories. According to him individual animals have no narrative

capability and can only react to the present moment (although social behavior shared amongst a group of conspecifics can enact hunting narratives that appear to be planned). Higher-order consciousness subsumes primary consciousness and appears later in the evolutionary record. With the advent of language capacity, humans for instance, can combine past history, future plans and self-reflection and therefore can imagine the future without necessarily being in it. For Crick and Koch, there are n**eural correlates to consciousness (or NCC)** which represent, in their words, "the minimal set of neuronal events and mechanism jointly sufficient for a specific conscious percept... There must be an explicit correspondence between any mental event and its neuronal correlates." In other words, for any given change in one's subjective mental state it must be accompanied by an associated change in neural state. Gerald Edelman has proposed what he calls the "dynamic core hypothesis" to explain two central qualities of consciousness: its seamless or unitary feel, and its highly differentiated quality. Crucial, here, is the simultaneous capacity of the complex brain to, on the one hand, host a vast and differentiated array of small heterogeneous brain maps that can act quasi-independently, while, at the same time, retain the capacity to respond and act together as a unified and integrated whole. According to Edelman, in the same article, dynamic reentrant interactions are responsible for this integration and bind assemblages of cognits and neuronal maps intermittently as they are modulated by incoming sensory signals from the environment, the body, and the brain itself.

I would like to suggest that his Reentrant Dynamic Core Hypothesis might be an adequate metaphor for the workings of neoliberal global capitalism as well, in which the new technologies of the Internet work somewhat akin to **reentry** to bind diverse and differentiated **cultural** constructs, in the form of, for instance, a nation-state on the one hand and of so-called world global culture on the other. I am not saying that this brain model is imposing itself, or that it is constituted by these conditions. Rather, the idea offers an interesting metaphor to understand how specific **cultural** identities might be maintained in the face of the powerful, integrating force of global culture powered by **cognitive capitalism**.

NEURAL DARWINISM **Neural Darwinism**, or the Theory of Neuronal Group Selection (TNGS)—as formulated by Gerald Edelman in his book, ***Neural Darwinism***—delineates three stages of neural development in the brain:

1
Developmental selection, or the production of the **primary repertoire**.

2
Experiential selection, or the production of the **secondary repertoire**.

3
Reentry, which stabilizes and elaborates the connections of the **secondary repertoire** through processes of ongoing parallel signaling, leading to temporal correlations reflected as units of selection, called "neuronal groups." **Neural Darwinism** is related to Neural Constructivism but proposes some important differences. Neural Constructivism, as proposed by Steven Quartz and Terry Sejnowski in their paper, "The Neural Basis of Cognitive Development: A Constructivist Manifesto" (1997), suggests that the weakness of the theory of **Neural Darwinism** lies in its dependence on the notion of prespecification. Its

theories necessitate, for instance, that the network must build in the problem of the diversity of the world *a priori* in the limits of its own variability. They concede that even though **Neural Darwinism** might work in a laboratory, where all **variation** could be limited, and, thus, prespecified, the real world in which we live in is constantly changing in ways we could never know beforehand. The variety of artistic and architectural permutations being generated through the activity of, for instance, the artistic *avant-garde*, are constantly mutating the conditions of the urban and virtual designed space. Genetically prescribed variability can never live up to the task of coding for the ever-changing conditions of the world picture, or "world cinema." Just-in-time interactive mutability, as a result of the brain's neuroplastic capabilities, offers a solution. Neural Constructivism proposes that instead of simply being a regression of neural elements after their period of exuberant growth, as a result of cell death, development is "a progressive increase in the structures underlying representational **complexity**," and that these changes depend on an "interaction" with an unstructured stochastic environment to guide development, as well as the processes of **self-organization** and **emergence**.

NEURAL DUST **Neural dust** refers to implantable piezoelectric crystals that are 3mm. in length, 1mm. in height, and 80mm. in width and that are powered by ultrasound pulses. Research with rats has shown that they can collect and transmit data from deep inside the body. So far, **neural dust** has only worked in the peripheral nervous system; there is hope, however, that it can, one day, be implanted in the human **central nervous system**. In the future, networks of such devices could be scattered throughout the brain, opening the door to "electroceutical" treatments for diseases like epilepsy (as well as, potentially, forms of torture and neural surveillance).

NEURAL ETHICS **Neural ethics** is a field of study some contend emerged in 2002 when the Dana Foundation organized a conference entitled, *Neuroethics: Mapping the Field*. The discipline focuses on ethical issues raised by research on the brain and the political, economic, and social concerns our new understandings raise. I am using the term here in a very restricted sense as part of a manifesto delivered in an address at the College Art Association in 2018. **Neural ethics** refers to every individual's inalienable right to convert the potential of their brain, in its postnatal condition, to its full possibility and **complexity** in adult form. This right of transition is an inalienable natural-born one. According to John Locke, rights like life, liberty and property are God-given and can never be taken or given away. **Neural ethics** explore the ways in which these traditionally recognized rights interact with emerging ones resulting from digital-biological feedback systems. **Neural ethics** as a discipline is centered on the brain's capacity to be plastic and malleable, as well as humanity's ability to produce novel **cultural** environments that are complex and intricate. These rich environments feed back into the brain to shape it. **Neural ethics** concerns our right to take part in this transformative process, which right-wing governments indirectly are now in the business of restricting through control of information in order to curb, regulate, and normalize open and heterodox neural modulation.

NEURAL MATERIALISM **Neural Materialism** is the doctrine, which elucidates the causal relationship between events taking place in the external world and parallel events occurring in the brain, which records and stores

them. Important in the present context is the co-evolutionary relationship between these two evolving conditions and the resulting modulation of the neural substrate. **Neural materialism** is closely aligned with the idea of material engagement as expressed in the article, "The Cognitive Life of Things: Archaeology, Material Engagement and the **Extended Mind**" (2010), by Lambros Malafouris and Colin Renfrew. They write:

> Firstly, and ontologically speaking, things can be said to have a cognitive life insofar as things are constantly implicated in networks, or better "meshworks" of material engagement. More simply things have a cognitive life because minds have a material life. Thus, very often, what we call an "object" is part of what we call a "subject." In short, things *are* us or *become* us.

NEURAL PLASTICITY Today the brain is thought of as a site upon which contested discourses at play in the environment impress themselves upon the wet, mutable material brain resulting in a brain in a state of becoming. The mechanism of the environmental effects are the result, according to Jean-Pierre Changeux, of changes occurring in the synaptic organization of the cerebral cortex. Although **neural plasticity** is more intense in the immature brain, it is also a characteristic of the mature brain and continues throughout life. Victoria Pitts-Taylor in her *The Brain's Body* (2016), draws attention to a second wave of synaptic sprouting occurring just before puberty and undergoing pruning for years after. Epigenesis and **neural plasticity** have assumed a greater importance in the neural economy as the material intracranial brain is the new site of a concerted and conscious desire by corporations and big data to commoditize and privatize its form and function.

NEURAL REGRESSION **Neural regression** helps us to understand how drugs like **ayahuasca** return the brain to its potentially initial state—the state of **neural zoe**, preceding the neural *bios*, or politicized brain. **Neural regression** is an extension of the Freudian idea of psychic regression. According to Freud, the ego reverts to earlier stages of psychosexual development as a means of defense. **Neural regression**, however, follows the model developed by Herbert Spencer and expanded by the neurologist, John Hughlings Jackson. In this model, disease or medication affecting a higher cerebral center, like the frontal cortex, release previously subjugated lower-brain centers from top-down control. The lower center, detached from the frontal lobe's cognitive grip, can then express itself, and, in some instances, gain control of consciousness. This deprecation of input from the frontal cortex and the resulting increase in parietal input leads to divergent, rather than convergent thinking.

NEURAL TECHNOLOGIES **Neural technologies** refer to the vast number of recently invented apparatuses that interact with the brain. They vary from nanotechnologies and processes, like **optogenetics** and **neural dust**, to larger devices, like **brain-computer-interfaces** and cortical implants. According to Jeff Stibel's 2017 article in *Forbes,* entitled, "Hacking The Brain: The Future Computer Chips In Your Head," Elon Musk of Tesla Inc. and Mark Zuckerberg of **Facebook** are heavily investing in a new kind of cortical implant called "BrainGate" which wirelessly connects the human brain to computers. **Neural technologies**, ostensibly used for a variety of medical and rehabilitative purposes, will, in the future, likely be redirected to form the basis of the **Statisticon**, and other, more sinister, applications such as **memory** distortion, neural surveillance, and mind-reading.

NEURAL SUBSUMPTION **Neural subsumption** is an extension of formal and **real subsumption**, in which the entire life of the mind—both its conscious and unconscious states—are recorded and subsumed as cognitive labor. In the regime of **cognitive capitalism**, the only difference between conscious and unconscious thought will be the degree to which they drive data and cognitive performance in the **"Internet of Everything" (IoE).**

NEURAL VARIABILITY AND DIFFERENCE According to Olaf Sporns in "Selectionist and Instructionist Ideas in Neuroscience" (1994), **neural variability and difference** in the human nervous system corresponds to the indeterminacy of the information content in the world. **Variation** is a key component of what Gerald Edelman calls the "**primary repertoire**," which is the condition of the brain at birth, specifically, its populations of **neurons**, axons, **dendrites**, and **synapses**. Neural **variation** results from the inherent differences of the parents' chromosomes, the emergent conditions resulting from their combination and expression, the history of the evolution of the species in **deep time**, and events occurring in the intrauterine environment, such as fetal access to nutrition and the effects of possible maternal infection. A second level of variability is expressed through a process of epigenesis as the neonate interacts with the variable, continuously modified **cultural** environment. Frequent encounters with consistencies in that environment lead to differential amplification of similarly tuned neural elements. Art has the power to create evolving forms of variability as well as recurring events in the form of style and salience that couple with the equally diverse forms of the brain's own variability.

NEURAL ZOE Borrowing Giorgio Agamben's distinction made in his book, *Homo Sacer* (1995), between natural, or "bare," life- *zoe*- and the *bios,* or political life, I have proposed the terms "**neural zoe**" and "neural *bios*."

The **neural zoe** denotes the "natural" life of the brain, meaning its **primary repertoire** before the process of epigenesis gives rise to the politicized, socialized, and normalized brain, or "**secondary repertoire**." The **secondary repertoire** is also called the neural *bios*, or the *neuropolitikos*: the neural plastic brain is sculpted as a result of its continuous interaction with the social, political, and **cultural** environment. The emancipatory possibilities of this process need to be considered alongside its more negative elaborations.

NEUROAESTHETIC MODEL The **neuroaesthetic model**, as understood by Charles Wolfe in his essay, "Three Neuroaesthetics" (2016), consists of three different models: the positivist, idealist, and militant. Positivist neuroaesthetics attempts to explain an aesthetic field and its production, such as painting, by referring to neuroanatomy aided by technology and neuroimaging. Its goal is to explain the process of painting as a result of neural processing itself, rather than as something happening independently, or outside of, the brain's jurisdiction (for example, as processes happening in the world of art). Two proponents of this position are Semir Zeki in his book *Inner Vision* (1999) and Eric Kandel in *Reductionism in Art and Brain Science* (2016). What is missing in this account is that it leaves out and at times discounts the intentionality of the artist as a provocateur or the social, political, economic or **cultural** becomings that provide the context of the works production for instance, its reactivity to previous conditions in which it is embedded, its political importance as an instrument for social change, its capacity to exist as an idea or **immaterial labor** and its desire, in some instances, to be an impetus for a different and unpredictable future. Rather it is instead understands art as an assemblage

on non-changing essences that can be experimented upon and which produce scientific facts rather than artistic ones: facts that together form the vast scientific universe with its own determinant rules and ideas of truth. It refutes the importance of **emergence**.

The idealist model recognizes the importance something like plasticity plays in the brain's adaptations to changes in the aesthetic field. Much like Gilles Deleuze's ideas in *Cinema 2: The Time-Image* (1985), it emphasizes that creating new circuits in art means creating new circuits in the brain. According to Wolfe, this follows naturalist accounts like Andy Clark's idea of a scaffolding, in which our brains are engaged in looping interactions with our produced environment, which displays intergenerational **cultural memory** in the form of designed space and time. This is especially relevant to our discussion of **cognitive capitalism**, where immaterial work forms subjectivity. Finally, the militant or activist model uses the idealist perspective as a springboard, but goes one step further by assuming that the changes plasticity brings about have political importance. It understands that neuroaesthetics is key to the emancipatory ethics and politics at odds with what Michel Foucault called the process of governmentalization and ***mentalité***. This glossary and the project of **neuropower** are examples of the militant approach.

NEUROBIOLOGICAL SUBLIME The **neurobiological sublime** is a condition constituted by two different mechanisms. First, in our moment of accelerated media capitalism, the brain's capacity to change in relation to new forms of data emerging in the techno-social-**cultural** *milieu* becomes overwhelmed. This is analogous to what Franco "Bifo" Berardi, in the *Soul at Work* (2009), refers to as "panic," in which the social brain is overpowered. Here, we understand this process occurring due to the limits of the brain's **neural plasticity**.

The term refers to a condition of disorientation and destabilization, in which the brain, having been originally sculpted by a specific form of designed **cultural** *habitus*, e.g. modernism, prevalent during its sensitive or critical period of development (inducing specific use-dependent perceptual and cognitive habits), must adapt in later life to a radically shifted arrangement of objects, and relationships arranged in an unfamiliar space and time. As Fredric Jameson suggests, when experiencing the Bonaventure Hotel, habits of perception formed by the Euclidean dimensions characteristic of modernism are not up to the task of understanding the new, infinitely curved spatial and temporal dimensions of, for instance, the Riemannian geometry of postmodern hyperspace.

NEUROCENE The **neurocene** is a condition of the brain itself, and describes the effect of the **Anthropocene** and Capitalocene upon it. It results from the sculpting of the brain through its epigenetic relationship with **deep time** and the transformed and terraformed environment. This sculpting can be generational, occurring in one's own lifetime, or trans-generational, occurring from one generation to the next. For example, our refusal to accept and take responsibility for the facts of climate change may result from a flood of misguided information, **memes**, and **fake news**. **Fake news** is more engaging or phatic, than real news. **Phatic images**, as Paul Virilio states in his work, *The Vision Machine* (1994), are targeted images that you are forced to look at and which hold your attention. Capitalists understand their power to create consumer attention and **valorization**. **Fake news** is processed as more salient and important, and, thus, may be preferentially selected for by neuronal groups in the competition for cerebral space. Thus, it may also subsume those neural systems involved in long-term and **working memory**, and, as

a result, influence proper choice selection, when comparison shopping in the marketplace of ideas.

NEURODIVERSITY ***Neurodiversity***, as originally defined, argues that the wide **variation** in the structure of the brain should be considered a resource for difference and adaptability. As Harvey Blume wrote in a 1998 issue of *The Atlantic*:

> **Neurodiversity** may be every bit as crucial for the human race as biodiversity is for life in general. Who can say what form of wiring will prove best at any given moment? Cybernetics and computer culture, for example, may favor a somewhat autistic cast of mind.

Individual neurological differences, thus, should be as respected as any other form of human **variation**. This **variation**, according to Olaf Sporns, Giulio Tononi and Rolf Kötter in their review, "The Human **Connectome**: A Structural Description of the Human Brain", is the result of the tremendous amount of **variation** at the levels of the micro and macro structures of the brain which result from an interaction between neurogenesis and experience. In the case of the former, it is a result of prenatal events occurring in the mother's womb and the **variation** in the human genome acquired over the evolution of the species. In that of the latter, matters are related to the personalized experiential repertoire of daily life that leave their mark on the neural plastic brain. The key socio-political consequences of this idea of **neurodiversity** are two-fold.

Firstly, **neurodiversity** explains the epidemic of new mental disabilities and categories affecting the American public. These categorizations are the result of institutional psychology interacting with the epigenetic expression of a diverse neural substrate (with a great potential for different expressions depending on new environmental contingencies). This was one of the foundational concepts of my three volume series, *The* **Psychopathologies of Cognitive Capitalism** which suggests that we need to understand differences in cognitive functioning not necessarily as "dysfunction", but rather as functional expressions of brains situated in diverse habitats. Brain differences should be thought of as an expression of bio- and **cultural** diversity and their entangled coevolution.

Secondly, expressions of **variation** are important factors for what Judy Singer in the introduction to her book, ***NeuroDiversity:*** *The Birth of an Idea,* refers to as a politics of Neurological Diversity, or '**Neurodiversity**'. The 'Neurologically Different' represent a new addition to the familiar political categories of class/gender/race and will augment the insights of the social model of disability.

She furthermore states that she is "credited with the coinage of the word '**Neurodiversity**', which journalist Steve Silberman described... as the 'subversive meme' that became the 'rallying cry of the first new civil rights movement to take off in the 21st century.'"

NEUROECONOMICS According to Paul W. Glimcher, in a book co-authored with Ernst Fehr, called ***Neuroeconomics****: Decision Making and the Brain*, **neuroeconomics** evolved through the entanglement of two fields of related research: one emanating from neuroscience and the other from behavioral economics. These fields are linked by an investigation of the relationship between neural activity and the economic theory of free choice in decision-making circumstances.

NEUROFEMINISM **Neurofeminsm** is a rebuke to neurosexism and the purported differences between the brains of men and women. This field owes much to the groundbreaking book, *Myths of Gender: Biological Theories*

about Women and Men (1985), by Anne Fausto-Sterling, which investigates the biases at work in scientific research. Fausto-Sterling finds very little hard evidence for biologically-based sex differences. Following her path, neurofeminists have asked whether the results from basic neuroscientific research methods and protocols are also skewed; they have begun developing a more gender-adequate neuroscientific approach. This approach is also well documented in Cordelia Fine's *Delusions of Gender: How our Minds, Society, and Neurosexism create Difference* (2010).

Importantly, their methods move away from the MRI snapshot-based approach of imaging and assessing the brain's anatomy, which offers a diminished dynamic developmental perspective. Visualized structural differences may result from different socio-cultural-political rearing practices and gendered attitudes upon the brain's **neural plasticity**.

NEUROMARKETING **Neuromarketing** is commonly understood as the use of highly sophisticated brain-imaging machines to understand how the brain reacts to various stimuli instrumental for marketing. In "What is '**Neuromarketing**'? A Discussion and Agenda for Future Research" (2007), Nick Lee and coauthors draw attention to a broad range of research agendas beyond how the brain responds to brands and advertisements. More precisely, **neuromarketing** is the application of neuroscientific methods to analyze and understand human behavior in relation to markets. **Neuromarketing** is especially concerned with how consumers make choices. One notable study, by Samuel McClure and coauthors, stands out. In "Neural Correlates of Behavioral Preference for Culturally Familiar Drinks" (2004), researchers found a higher preference for Coca-Cola over Pepsi, corroborated by fMRI evidence of elevated recruitment of the hippocampus and dorsolateral prefrontal cortex during choice-making (later research did not, however, corroborate these findings). Trust, pricing, negotiation, and ethics have all been deemed important areas for marketing scholars.

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NEURON A **neuron**, or "nerve cell," is the basic functional unit of the nervous system. **Neurons** excite and inhibit each other through the release of chemical substances (neurochemicals) at **synapses**—the tiny spaces that separate them; their effect can be excitatory or inhibitory. Neural circuits can be monosynaptic or polysynaptic, depending on the **complexity** of their function. Electric **synapses** are also available for inter-neuronal communication but lack the subtlety of chemical **synapses**.

NEURONAL RECYCLING HYPOTHESIS In his article, "Evolution of Human Cortical Circuits for Reading and Arithmetic: The **Neuronal Recycling Hypothesis**" (2004), Stanislas Dehaene attempts to understand the means and mechanisms through which the human visual word-form area—necessary for reading—evolved so rapidly in the intervening five thousand years since reading appears to have entered human culture in Mesopotamia. This theory is not concerned with the generational pressures of epigenetic mechanisms that sculpt neuroplastic tissue in response to an environment predominated by writing; rather, it argues that certain areas of the brains of macaques (primates)—specifically, the inferior temporal area of the temporal lobe—share attributes with the human visual word-form area as well as the sensorial world they are tuned to. In fact according to Dehaene his model is dependent on the fact that there is a limit to neural plastic potential. Writing and reading develop as a coevolving process with the brain and each slowly guides the others capacities. Something he refers to as a neuronal niche, but I would like to suggest is a neural-**cultural**

niche. The causes of neuronal recycling are pertinent for us here. There are analogous and similar affinities of processing between the recognition of stereotyped facial expressions and gestures in the macaques and the recognition of stable sign and symbol forms on a piece of clay or papyrus. A secondary factor that may have contributed to the process of neuronal recycling is that the importance of facial mannerisms in communication was reduced. As a result, it is hypothesized that the inferior temporal area became designated for reading. Thus, when subjects read while being scanned in an MRI or fMRI machine, this human visual word-form area is activated. Other functions like numerosity and tool use share common substrates with reading. Knowledge and tools use find a universal substrate in the left anterior parietal cortex. In his article (with Laurent Cohen) "**Cultural** Recycling of Cortical Maps," Dehaene suggests that "Tool use training leads to a shift in parietal **neuron**'s spatial **receptive fields**, an induction of expression of immediate early and neurotrophic factor genes, and even a growth of new connections to distant cortical areas. Thus, a brain area with the capacity to be recycled for tool use may already be present in the monkey, although it appears probable that it is specifically enhanced in the human brain."

NEUROPOWER **Neuropower** constitutes the new focus of **biopower** to normalize difference and sculpt a homogenous population of people. It consists of three key ideas, all of which are directed towards populations of minds and brains. First and foremost, **neuropower** acts upon the neural plastic potential of the brain in a living present. Secondly, the rules and regulations that created conscripted bodies, referred to as "**biopower**," and previously linked to **Taylorism** in **Fordism**, have now been modified to focus, instead, on creating efficient minds and brains, which I term "**Hebbianism**."

Finally, **neuropower** is the result of the redirection of the armamentarium of power from its focus on the distributions of sensations in the natural and designed world to those distributions performed in the **working memory**. This shift is constituted by short- and long-term memories that are summoned to produce mental imagery and which may be related to internal selective attention—the actuation site of which is located deep in the frontal cortex.

NEUROTYPICAL **Neurotypical** or NT is a descriptive term used by autistic people to classify those supposedly 'normal' individuals or non-autistic spectrum people whose neurological status is distinctly different from their own. It can be used as a parody to describe normality as a disease itself. Recently the term has been contrasted with the term **neurodiversity**, which argues that neurological conditions are expressions of the inherent **variation** residing in the human genome. Here I would like to use the terms **neurotypical** and **neurodiversity** as metaphors for the socio-political and **cultural** production of **a people** in the former and the multiplicity in the latter.

NODES **Nodes** are the fundamental elements of a network. Pairs of **nodes** are connected by edges, which can be either directed or undirected.

NOISE (MUSIC) The Italian Futurist, Luigi Russolo, has often been described as the first **noise** artist. **Noise** was also an important area of creative investigation for Dada and Fluxus artists. Recently, **noise** has been incorporated into mainstream music, for example, Lou Reed's *Metal Machine Music* (1975), and Throbbing Gristle's provocative industrial sound, which foregrounds dissonance. *In The **Undercommons**: Fugitive Planning & Black Study* (2013), Stefano Harney and Fred Moten understand

noise, disordered sound and improvisational jazz as a part of a call of the "extra-musical." We are called by the extra-musicality of the cacophonous because, in the musical, we become aware of musicality's arbitrary **nature**, which, in another world, would be incomprehensible. Listening to cacophony and noise tells us that there is a world beyond the structures we inhabit and that inhabit us.

OCCUPY MOVEMENT OCCUPY WALL STREET (OWS)

The **Occupy movement** is an international progressive left-wing movement, which supports various forms of protest especially against economic inequality, high cost of education and the lack of real democracy due to the influence of big corporations. From it sprung **Occupy Wall Street**, which was initiated by Kalle Lasn and Micah White of the Canadian proactive consumer publication, *Adbusters*. Inspired by the Arab Spring movement it was instigated on September 17th, 2011 when a crowd of protesters used an unauthorized encampment inside Zuccotti Park as the site for the initiation of marches and other forms of dissent. It activated other protests worldwide, lasting for fifty-seven days. The protestors were forced out on November 5, 2011. The **OWS** was also responsible for the slogan "We are the 99 %."

ONE-DIMENSIONAL MAN, ONE-DIMENSIONAL WOMAN

Herbert Marcuse's ***One-Dimensional Man*** (1964) is an early classic of Marxist social critique focusing on **alienation** and **affect**, and the means through which advanced technological society and especially mass media restructures labor and leisure to influence modes of thought. This results in a loss of individuality and the ability to dissent or control one's own destiny. As such it forms the foundation for later theorists of media such as Bernard Stiegler, especially his ideas

of technicity and cinematic time in which a world of objects is replaced by a one-dimensional technical world of pure instrumentality or instru-mentality. Important to this contemporary mode of domination is the disappearance of genuinely radical forms of critique and the normalization of all opposition and the production of an advanced state of conformity. But his was not only a pessimistic worldview. He also opposed these forms of uncritical thinking with that of a critique which he termed "negative thinking." Essential to Marcuse's argument is the distinction between one-dimensional and dialectic thinking in which one-dimensional thought derives their standard criteria from that already predominating in society. According to Douglas Kellner in his introduction to the second edition of ***One-Dimensional Man***, "Critical and dialectical thinking, by contrast, postulates norms of criticism, based on rational potentials for human happiness and freedom, which are used to negate existing states of affairs that oppress individuals and restrict human freedom and well-being. Dialectical thought thus posits the existence of another realm of ideas, images, and imagination that serves as a potential guide for a social transformation that would realize the unrealized potentialities for a better life." Furthermore, Marcuse sees the importance of art and great philosophy as the locus of these potentialities and critical norms.

I believe this potentiality is the springboard for Nina Power's riff on Marcuse entitled ***One-Dimensional Woman***, in which she, like many of her counterparts, rewrites **cultural** histories in an attempt to reclaim the female body in an alternate accounts and trajectories in order to usurp formerly unique male positions and histories. According to Power, advanced contemporary society is now dominated by mass consumerism, which coincides with supposed female emancipation – or does it? To counter a number of strategies

currently at hand like decoy body politics as well as the coopting of the language of feminism in the dramaturgy of imperialist advanced capitalism for instance in the public relations of waging war in Islamic countries she tries to find solace and **creativity** in pornographic representations of supposed freedom. Like with her male counterparts described by Marcuse in ***One-Dimensional Man***, the capacities of advanced capitalism and consumerism have masked the real conditions at hand and obscured them enough to make them indecipherable to a cognition that has been formed and tethered to its rhythms of real fictive deployment.

OPAQUE ALIENATION **Opaque alienation** is a term I developed for my essay, "**Duende** and the **Neurobiological Sublime**" (2014) to describe the limits of the brain's neural and cerebral plasticity in our moment of **cultural** and technological acceleration. This boundary condition can manifest either as a sense of a lack, or an excess. For instance, when confronted with the new conditions of the digital **cultural** environment, a subject whose **neural plasticity** was sculpted in a modernist regime, characterized by the rules of Euclidean geometry, may not be able to meet the demands of the new perceptual and cognitive tasks of the post-modern environment designed according to the curvilinear and spherical geometries of, for example, Riemann Manifolds which characterize parametrically designed environments. In such situations, the subject is challenged mentally, and is acutely aware that something is amiss; this is the experience of **opaque alienation**. The subject lacks the neurobiological apparatuses to make sense of the new logic of the **cultural** *habitus*, because the subject was raised in a different **cultural** environment, in which the logics of these Riemannian temporalities and spaces were not coupled and stabilized as neural material architectures—an environment

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that did not prune and sculpt neuroplastic potential to process adequately these new temporalities and spaces. Thus, these temporalities and spaces can appear as **noise** or nonsense. **Opaque alienation** differs from **transparent alienation**, also defined in this glossary, to the degree to which it causes disrupted mental and psychic life. **Transparent alienation** can manifest itself as an adjustment problem, poor job output, or unhappiness. In **opaque alienation**, pharmaceutical intervention can at times be necessary. Depression, Attention Deficit Disorder (ADD) and panic disorders are examples of this form of **alienation** and its resulting psychopathologies.

OPTOGENETICS **Optogenetics** is a recently developed laboratory methodology by which genetically modified **neurons** taking part in neural circuits first learn a task through conditioning. After repetition, the task is recorded as a long-term **memory** in the activated neuron. The **memory** and the learned task it is associated with can be turned off and on by a shining laser light. This method has been used to control the **memory** and behavior of mice in vivo.

ORIGINARY TECHNICITY **Originary technicity** is a theory related to the concept of extended cognition, which was initially put forward by Bernard Stiegler. Stiegler and followers of the theory claim that technology is not something external to human cognition but that technology constitutes and becomes part of it through a process of externalization. The concept of cinematic time generated by image technologies and their movement-flows on screens of all sorts was especially important to Stiegler. These flows transform the temporal organization of consciousness itself.

PANOPTICON In the model of the **panopticon**, many are watched by few. A notable example is the **panopticon** designed by the British utilitarian philosopher, Jeremy Bentham, which is discussed by Michel Foucault in his *Discipline and Punish: The Birth of the Prison* (1975). Bentham's model, proposed in the late 18th century, was later adapted for hospitals and factories. The design consists of a single central tower inhabited by a guard who can watch a menagerie of surrounding prison cells without being seen. Today, telecommunications networks like the Internet substitute for the tower as we are all watched by sophisticated **algorithms** which track our every search, like and dislike and on-line hotel and plane reservations. According to Byung- Hul Chan in his ***Psychopolitics:*** *Neoliberalism and New Technologies of Power* (2017), "Today, unbounded freedom and communication are switching over into total control and surveillance. More and more, social media resemble digital panoptica keeping watch over the social realm and exploiting it mercilessly. We had just freed ourselves from the disciplinary **panopticon**, then we thrust ourselves into a new, and even more efficient, **panopticon**."(page 8)

PEOPLE (A/THE) According to Paolo Virno, in *A Grammar of the* ***Multitude*** (2004), "**the people**" occupies the opposite pole to that of "the **multitude**" in Virno's continuum describing political social categories. These two terms are the brainchildren of Thomas Hobbes and Baruch Spinoza who describe their significance for the state with two opposing visions. On the one hand, Spinoza considers that the **multitude** "indicates a plurality which persists as such in the public scene, in collective action, in the handling of communal affairs, without converging into a One [...]." On the other hand, Hobbes understands the **multitude** as the mode of being of the many and as a danger to the political decision-making process of the state. Virno quotes Hobbes from *De Cive* (1642), "**the People**... is one, having one will, and to whom one action may be attributed." Furthermore the **multitude** for him reflects a state of **nature** and precedes that which precedes the body politic. **Nature** with its exuberant differences is molded into a homogeneous people in which differences are normalized by the state.

According to Michael Hardt and Antonio Negri in ***Multitude,*** **the people** is a product of a process of the normalization of differences in a heterogeneous population of subjects to produce one identity. Today, with our advances in new technologies and **data mining**, the **multitude** is no longer ungovernable, because its differences are no longer an obstruction to being administered. In fact it is an essential component to post-Fordist economies, which celebrate difference and customization. In the context of this glossary, **the people**, as opposed to the **multitude**, are understood as a reflection of the basic **complexity** of the brain. Complex brains are a metaphor for the **multitude** being composed of networks that that are highly differentiated and heterogeneous as well as having the capacity for integration. As Olaf Sporns writes in his book, *Networks of the Brain*, complex brains are created, or co-evolve, with complex environments generationally within a lifetime, and intergenerationally, as part of the story of the evolution of the species. Simple brains are a metaphor for **the people** and are constituted by more similar and homogeneous networks.

PEPE THE FROG **Pepe the Frog** is the subject of a series of popular Internet **memes**. Pepe is an anthropomorphic frog with a humanoid face that first appeared on the Internet in 2005 in the online cartoon, *Boy's Club*, written and drawn by Matt Furie. The **emergence** of Pepes bearing an uncanny resemblance to Donald Trump appeared in 2016 during the US presidential election. Although originally not created to express

racist and/or bigoted sentiments—Furie, for example, described his intended role for Pepe as that of "a peaceful frog dude"—in the hands of meme-makers from the website Reddit and **4chan** boards, particularly /pol/, Pepe **memes** have been used to spread racist iconography and white supremacist messages. In 2016 the Anti-Defamation League collaborated with Matt Furie to form a #SavePepe campaign to reclaim the symbol from those who use it in an inappropriate way. Furie eventually conceded the struggle and held a cartoon funeral for his character.

PERCEPTION-ACTION CYCLE (PA CYCLE) The **perception-action cycle** describes the adaptation of the organism to its environment during sequential goal-directed behavior. It is based on cybernetic feedback processing in which each action creates an environmental change that is sensed, analyzed, and reacted to. According to Joaquín Fuster in his book, *The Neuroscience of Freedom and **Creativity**: Our Predictive Brain* (2013), this cycle involves a looping of the posterior perceptual brain and the executive frontal brain through interaction with the environment.

PERCEPTRON In the 1950s, the "**perceptron**" was an idea hypothesized by the psychologist, Frank Rosenblatt, as a means for recognizing emerging patterns purely on the basis of changes in connectivity in **neuron** like components The **perceptron** was modeled after living systems, notably the **retina** and other sensory systems that work in parallel and transfer information amongst their component parts. It is a network of artificial **neurons** in which each **neuron** has an activation weight or value (A or B), depending on whether it is excitatory or inhibitory. Each **neuron** sums the total activations or inhibitions; if the value is larger than the threshold value, the **neuron** fires. A multilayer **perceptron** is a variant in which **neurons** are organized in layers. All **neurons** in one layer take input from the preceding layer and calculate the value in parallel. This is called "parallel processing." Information from one layer operates on the information it receives in a specific way that can be learned. In the end, an output is realized and performed by actuators.

PHANTOM LIMB SYNDROME **Phantom limb syndrome** is characterized by the experience of sensations in a previously amputated limb, such as pain, itching, and twitching. Phantom breasts and eyes have been reported after mastectomy and enucleation, respectively. According to Joline C. Bosmans and coauthors in their article, "Factors Associated with Phantom Limb Pain: A 3 ½ year Prospective Study" (2010), about 66 percent of patients experience phantom-limb pain after amputation. According to Sae Young Kim and Yun Young Kim in their article "Mirror Therapy for Phantom Limb Pain," although there are a variety of treatments for phantom limbs including narcotic, anti-epileptic, analgesic and anesthetic medications as well as nerve blocks and transcranial electrical nerve stimulation there is no easy remedy that has proven full proof. The treatment of phantom limbs took a giant leap forward in 1996 when V. S. Ramachandran and D. Rogers-Ramachandran, in their article "Synaesthesia in phantom limbs induced with mirrors," introduced their mirror box therapy for patients with phantom limbs with significant results. In this therapy the patient experiences and feels an imaginary movement in the amputated limb which helps rewire the sensori-motor cortex of the brain ostensibly inciting a therapeutic decrease in the pain of the phantom.

Remapping is another phenomena expressed as part of the phantom limb phenomena and is associated with neuroplastic changes in the sensory and motor cortices of the brain. It occurs when sensations of the

missing appendage, like an arm or leg, are expressed at an alternative site, such as the face or inner thigh respectively due to a shift of cortical representation of the deafferented cortical representation. Remappings, according to the philosopher Thomas Metzinger, in his book *The Ego Tunnel* (2009), are expressions of this innate body image set free by the act of amputation. The sensory-motor loop is short-circuited, and, as a consequence, the normal feedback relations that keep this alternative image repressed are emancipated and express themselves.

PHATIC IMAGE The **phatic image**, according to Paul Virilio in *The Vision Machine* (1989), refers to a targeted image that is the product of the post–industrialized **information economy**, conceived, and engineered to hold your attention and force you to look. Importantly, it is the result of an ever–brighter illumination that makes specific areas of the image more apparent while reducing others, such as the background, to a blur. **Phatic images** operate in the **attention economy** to attract awareness. Their appearance is constructed according to the laws of visual and cognitive **ergonomics** in which stimuli are created and designed with the processing proclivities of the eye and brain in mind.

PHENOMENOLOGY **Phenomenology**, according to Shaun Gallagher in his 2012 book of that title, begins with the fact that we are already always situated in the world and it is this fact that binds **phenomenology** to existentialism as either an adjacent epistemology or its fundamental source. Following Edmund Husserl's example, he understands **phenomenology** as a practice to comprehend things in themselves: "the ways in which the world comes to be experienced within the various situations that make up our lifeworld or *Lebenswelt* and specify our existence." The *Lebenswelt* is populated by other

human beings, many whom were there before our birth, and constitutes the primary fact or beginning point for **phenomenology**'s explanation of social cognition. As such, we could not be wrapped up in the isolation of Solipsism, and we are not locked up in some object like a brain but rather, as Gallagher posits following Heidegger's example, "in-the-world as agents engaged in pragmatically and socially defined projects."

Continuing with the insights of Shaun Gallagher, this time in his essay, "Liftoff: Towards and Exploration of Subjective Experience" found in his edited book, *A Neurophenomenology of Awe and Wonder: Towards a Non-reductionist Neuroscience* (2015), we find that **phenomenology** has two meanings in relation to consciousness and experience. First it pertains to the consciousness that a person experiences, its qualitative feel or, quoting Thomas Nagel, the what it is like to experience a sensation or perceive some object. Secondly it concerns the philosophical approach to studying these conditions of experience. **Phenomenology** uses a particular approach to understanding experience at odds with one that is scientific. What differentiates them is that science in its desire to be repeatable, objective and reductionist utilizes a third-person approach to their analysis. Third-person means that scientists attempt to take an objective and impersonal approach to what they study. In contrast to this approach, the phenomenological approach takes a first-person approach to analyze perception and feelings and what it means to be in the world. Conceptually this position reacts to the question of whether it is possible to investigate a first person generated attribute like consciousness using third person techniques and if so what is lost. Gallagher et al. ask this question in regards to pain and wonder if it is possible to understand pain thoroughly using explanations that depend on the reactions of nociceptive activations in

C-fibers? Secondly doesn't this reductionist explanation fail to account for what is most important for the phenomenologist, the explicandum or what the explanation is meant to explain in the larger sense? But the authors are well aware that to understand experience we must adapt both methods and the explanations they inhere. Borrowing from the work of Francisco Varela they bring the capacity of these two methods together without losing any of the potential capacity of others and call this approach neural **phenomenology**.

PHI **Phi** is a term first introduced by the neuroscientist Giulio Tononi in 2004 and it stands for Integrated Information Theory; as the name implies it describes the capacity of a neural system to integrate information. Consciousness represents an epiphenomenon of this integration of information and depends on two coexisting processes:

1
Differentiation, in which a large number of specialized structural connective states exist in tandem and which are segregated from each other to form a plurality of potential repertoires of exchange. This is also referred to as "functional segregation."

2
Integration, which, through each networks statistical dependencies upon each other, bind together their individual capacities, into transient seamless unities. A network that is both functionally integrated and highly specialized generates a high **PHI**. It is the consequence of being fully connected as well as simultaneously maintaining discrete and segregated networks

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of connections. In order for neural circuits to arise that have a high **PHI**, a physical system must undergo developmental changes to its structural and functional architecture as a consequence of experience-dependent plasticity.

According to Olaf Sporns in *Networks of the Brain*,

> The observed trend toward an increase in the **complexity** of a nervous system, expressed in its structural and functional connectivity may partly be the result of an increase in the **complexity** of the organism's environment, which is composed of a mixture of statistical regularities and randomness. Neural **complexity** confers an adaptive advantage because it enables a greater range of responses and a greater capacity for generating and integrating information about the external world as accessed through the senses.

What are some of the causes of this increased **complexity** of environment that introduces regularities and randomness? Today, as a result of designed urban space and virtual environments, institutional and artistic regimes compete for who, or what has the power to organize regularities and to introduce disorder. This is a very political statement.

PIZZAGATE **Pizzagate** is a debunked (and preposterous) conspiracy theory that went viral toward the end of the 2016 US presidential election. It was distributed on newsfeeds, chat threads, and message boards including **4chan** and Reddit as well as **Twitter**. The **Pizzagate** theory asserted that Hillary Clinton and some of her top aides were part of an international child sex-trafficking ring run out of the Clinton

Foundation and the basement of the Comet Ping Pong pizza parlor in Washington D.C. The alleged proof of these accusations came from the illegal hacking of Clinton's campaign manager, John Podesta's, personal emails, later publicly displayed on WikiLeaks, and from trawling through the **Instagram** account of the Comet Ping Pong owner, James Alefantis, searching for sexually lewd and explicit images. Eventually, tenuous imagery and tendentious readings of online postings by the protagonists were used to build false allegations and conclusions, some of which involved secret codes linking the word "pizza" with female genitalia and pedophilia. For instance, **Pizzagate** proponents claimed the phrase "cheese pizza" was a secret code for child pornography. A further elaboration of the conspiracy theory has recently come to light, accompanied by the hashtag, #FollowTheWhiteRabbit. It asserts that both Chelsea Clinton—Hillary Clinton's daughter—and Senator John McCain, among a host of other political and **cultural** figures, have already been convicted of pedophilia in conjunction with **Pizzagate**, and are being electronically monitored by law enforcement *via* ankle bracelets. These ideas underpin the emerging conspiracy theory known as QAnon.

PLATFORM CAPITALISM According to Nick Srnicek in his book, ***Platform Capitalism***, a new business model has emerged within the digital economy, a model based not on production, but upon using vast amounts of data to connect potential customers and clients to each other. Srnicek calls this "the platform". In the twenty-first century data has become vital for the growth of the new economy, and capitalism had to invent new methods and forms of general and collective intelligence with which to adequately deal with this emergent commodity which now defines its core.

Digital data is the record of an event that has happened online, and, in the world resulting from the efforts of **immaterial labor** that defines **cognitive capitalism**. The resulting log requires adequate forms of technology to collect, organize and monetize it. A certain amount of data has always been present in different business models, for instance, in the post-Fordist economy for firms concerned with so-called "lean" and "just-in-time" production. These were peripheral concerns, however, it was only in the twenty-first century that this model took on a central role.

Evolution of the means of recording, analyzing and tracking data became necessary, and the 'platform' arose to handle the new products of computational, digital and Internet technologies which simultaneously evolved along side it. According to Srnicek, the platform consists of a number essential characteristics. First, it is a digital infrastructure that allows two groups to interact. Furthermore, the platform acts as an intermediary that brings different uses together (e.g. customers, advertisers, service producers, and suppliers). Srnicek writes:

> This is the key to its advantage over traditional business models when it comes to data, since a platform positions (1) between users, and (2) as the ground upon which their activities occur, which thus gives it privileged access to record them.

Platforms are reliant on digital effects: the greater the number of users, the more useful the platform becomes. The greater the number and **variation** of the user population, the better and more exact the models that the search **algorithms** produce become, therefore, the better the network response to a user query. Finally, platforms embody politics as their core architecture determines what interactions are possible as well as

recapitulating the political relations of their users. Network dynamics are sculpted by means of user preferences over time. The "Google bubble" thus becomes an inadvertent and implicit sovereign **apparatus**.

PLURIPOTENTIALITY **Pluripotentiality** refers to capacity of stem cells to differentiate into almost any other somatic cell forms. The term has a somewhat analogous meaning when referencing the formed nervous system. Here, **pluripotentiality** is related to its inherent **variation**, composed, as it is, of a multiplicity of nervous elements and the networks they form. Gerald Edelman called this the "**primary repertoire**," a model for the composition of the brain shortly after birth. It includes the number of **synapses** and their forms, the number of **neurons**, the patterns of neurochemical distribution, the sequence of events at the growing tip of growth cones, their mutable tuning capacities, and learning induced **variations** of structure as a result of epigenesis in the post-natal period. According to Olaf Sporns in "Selectionist and Instructionist Ideas in Neuroscience" (1994), the **pluripotentiality** of the brain is an *a priori* and *a posteriori* condition reflected in its initial architecture, and, later, as a result of its shaping by a variable environment. In the former case, it readies the brain for the indeterminate content of the world of objects, events, and their novel relations, to which it will need to couple, and, in the latter circumstance, is a result of that interaction.

The **cultural** environment is constantly evolving as a result of the intersection of political, technological, social, architectural, and artistic relations as they interact with each other. Neural selectional and constructivist systems propose that the brain's variable population of neural elements (with variable characteristics and tuning personalities) allows for a differential response to an unknown environment. In a variable

population of **neurons** with variable characteristics, the result of genetic and adaptive prenatal events, there occurs differential amplification and stabilization of those elements most in sync with repetitive environmental contingencies, and cell death, **apoptosis**, for those elements, which are not.

The amplified neural elements produce the neural structures that are stabilized as a collectivity of such elements, and there occurs a secondary sprouting emerging from their interactive relationship. Thus, what at first constituted a pluripotential neural phenotype determined by innate and early intracranial events, expressed as a primary neural **variation**, is pruned by the extra-cranial environment into a finely-tuned sympathetic architecture. Intergenerational differences are the product of the **emergence** and difference erupting in both stages. **Emergence** operates in the first stage as an interaction between those singular elements that have been stabilized in the early sculpting process to produce varying **primary repertoires** between conspecifics. Intergenerational **cultural** differences, the product of, for instance, evolving technologies, are expressed in different forms of music, architecture, **poetry**, sculpture, painting, as well as forms of new media that sculpt neural plastic **neurons** and neural networks differently. It is the second phase, and the emerging neural architecture that results from their interaction, that is responsible for the non-homologous **cultural** habitus the next generation produces and which constitutes the generational differences that appear and form its identity.

POETRY "**Poetry** is the contamination of linguistic labor, the reconstruction of the symbolic flow," in the words of Franco Berardi as he described the power of the poet in our moment of **cognitive capitalism** in his book *The Uprising* (2012).

> We call **poetry** the semiotic concatenation that exceeds the sphere of exchange and the codified correspondence of the signifier and signified; it is the semiotic concatenation that creates new pathways of signification and opens the way to a reactivation of the relation between sensibility and time, as sensibility is the faculty that makes possible the **singularity** of the enunciation and the **singularity** of the understanding of a noncodified enunciation.

Like the **shaman**, the poet and artist create and use special languages to reach meanings outside the normalized realm of interpretation. In our world of semiotic capitalism, subsumed, as it is, within **cognitive capitalism**, where the brain and mind are the new factories of the 21st century, the poet, the **shaman**, and the artist estrange the semiotic *habitus* as it entangles itself in what Jacques Rancière has called "the distribution of sensibility," releasing it from its common use. Thus, **poetry** first estranges and disrupts the possible interpretations of the semiotic sphere by delinking language from normalized meanings and references. The importance of language in semiocapitalism especially, in relation to **valorization** and **financialization**, are well appreciated, as is **poetry**'s capacity to disrupt networks and create **dissensus**. This has ramifications for the embodied and extended material brain, which, as a result of its interactivity with this mutated **cultural** *habitus*, sprouts new patterns of connections in millions of **synapses** in the material brain, for instance, in the left, language-dominant hemisphere. This poetic neuromodulation provides the platform for a political agenda of art and **poetry**, a so-called **activist neuroaesthetics**. New networks in the semio-linguistic field perpetuated by **poetry** as it manifests itself as new forms of meanings, linguistic constructions, metaphors, and metonymy might mean the production of new networks in those neural systems important for the production of comprehension, understanding, and thought. This is the power of art.

POLITICAL ECONOMY **Political economy** is a term that dates back to Adam Smith's *General Enquiry into the **Nature** and Causes of the Wealth of Nations* (1776), David Ricardo's *Principles of **Political Economy** and Taxation* (1817), and John Stuart Mill's *Principles of **Political Economy*** (1848). In its origins, the two component terms, although emerging from two different Greek sources, "polis" (a city or group of citizens) and *okonomia* (household management) were considered as one term. It was only later, in a desire for methodological progress, and a more rigorous basis for economic analysis that the two terms were separated. Today, "**political economy**"—in contrast to the classical version—refers to how different political policies **affect** economic outcomes. The word "political" here refers to the mechanisms at play operating upon a collective of heterogeneous actors, with varying opinions, who are coaxed—or forced—to come together to form an optimized consensus and then act upon it. Economics is, then, the optimal use of scarce resources, and **political economy**, as the term is used here, concerns the direct or indirect coercion of a collective to make decisions that will have a positive outcome on the optimized use of scarce resources.

POPULISM **Populism** considers society to be divided into two homogeneous and antagonistic groups distinguished from each other, a pure people and a corrupt elite. According to Chantal Mouffe it establishes a political frontier mobilizing an underdog against those in power because of what they perceive as unjust practices. Politics, accordingly, should be determined as the output

expression of the general will of **the people**. Important to this distinction is the style of the performative and constitutive discursive field, which articulates populist voices and fuels and regulates its political imagination. Recently a populist fervent has taken hold in Europe and the United States fueled by a reaction against neoliberal politics, which has forsaken a certain constituency who feels abandoned by the traditional political parties. Historically **populism** is a political atmosphere embraced by the far right and formed the basis of the Volk of the Third Reich and is seen today in the swelling ranks of Trumpists and Brexiteers. Based on her notion of post-politics in which the distinction of left and right is blurred, Chantal Mouffe in her book *On the Political* (2005) has called for the establishment of left- **populism** as an alternative, in which anti-immigrant, xenophobic and authoritarian values are replaced by an anti-Wall street and class-based **dissensus**. A new space for the disaffected needs to be opened up and established that instead of restricting democracy radicalizes its pluralistic foundations.

POSITIVISM **Positivism** as a philosophy was first developed by Auguste Comte who extended the methods and concepts of science to apply them to society with the purpose of making the study of society more predictable, and based on law-like, quasi-scientific regularities among observable phenomena. This so- called "scientific sociology" was based on an evolutionary methodology in which each branch of knowledge undergoes a series of stages: theological, metaphysical, and positive (or scientific). Key to **positivism** was its role in the regulation of the inherent nonsystematic behavior of the humanities; what was named the "scientific-industrial-society" in which science would take on the role of a secular religion. Positivist and neo-positivist Marxism would emerge from this belief

in historical **materialism** as a science of the organization of social life. The members of the Frankfurt School were at odds with this point of view, seeing the most potent forms of human domination as linked to a technocratic ideology of which positivitism was its legacy. **Positivism** forms one of three theoretical streams that constitutes neuro-aesthetics; suitably named "positivist neuro-aesthetics." This tendency is at odds with the two other components, the idealist and activist modes. Artists, in the broad sense, constituted as a class by poets, performers, film-makers, painters, sculptors, just to name a few, use their own methods, apparatuses, and histories to investigate the fields of **memory**, sensation, perception, and feeling to produce their own facts and paradigms. Positivist neuroaesthetics attempts to use scientific methods to normalize and standardize artistic practices and works of art. Idealist and activist neuro-aesthetics emphasizes the power of art to mutate the conditions of the **cultural** *milieu*, especially its distributions of sensibility, with results for the embodied and extended brain to which it is linked. At issue in these models are the **nature** and consequences of brain's **complexity**, which requires a complex environment with which to interact in order to develop its full potential as a differentiated multi-scale population of connections.

POST-ANTHROPOCENE As Paul Crutzen and Christian Schwagerl explain in "Living in the **Anthropocene**: Toward a New Global Ethos," (2011) the **Anthropocene** is a geological epoch marked by human domination of the Earth's biological, chemical and geological processes with negative effects. The resulting imminent threat to the planet that this entails also puts the human race at risk. The **Post-Anthropocene** expresses the eclipse and beginning of the end of a human-centered history. I want to go one step further by speculating that

what initially begins as a decentering of an idealized humanity will be, in the end, its dissolution. Instead a very different situation will evolve in the Post- **Anthropocene**, resulting from the assemblage of new architectures and infrastructures built today such as telecommunication networks, unmanned ports, armies of autonomous tractors cars, and busses, just to name a few – which are not configured for human habitation at all, but rather machinic. We are on the precipice of a new configuration of planetary being in which humans will no longer dominate the earth's biological, chemical and geological process but will be replaced by AI and other machine technologies.

POST-CAPITALISM According to the journalist Paul Mason, the term "**postcapitalism**" refers to the changes brought about by new information technology or "info-tech" which will challenge the existing relations of the market economy, ushering in a new system. This new system operates beyond markets, carefully excludes **externalities** from economic modeling and rather uses them in understanding non-market conditions, deprecates the importance of private ownership, and decenters scarcity in market models. Mason considers forms of nonmarket-based exchange, the sense of community, and collaborative production as mechanisms for creating a postcapitalist economy. Mason lauds existing alternatives like peer–production, and sharing as foils to the ostensible "enlightened self-interest" of laissez-faire economics.

Thus, **postcapitalism**, in opposition to one of the core tenets of neoliberal capitalism, i.e. that there is no alternative to it, demonstrates that there are, in fact, a multiplicity of alternatives hidden in plain sight. Capitalism, according to Mason, is "a complex, adaptive system which has reached the limits of its capacity to adapt." Furthermore, echoing Friedrich Nietzsche in

Thus Spoke Zarathustra: "As with feudalism 500 years ago, capitalism's demise will be accelerated by external shocks and shaped by the **emergence** of a new kind of human being." The external shocks are different than those that heralded the transition from feudalism to capitalism, e.g. the Black Plague and the development of the banking system, yet share the same capacity to institute change. Today's horsemen of the capitalist apocalypse include energy depletion, climate change, an ageing population, automation, and info-tech. Acting together, these constitute the necessary conditions to provoke the demise of capitalism and potential for the **emergence** of **postcapitalism**. Additionally, the impending impacts of new technology may put the final nails in the coffin of capitalism. Among the most prominent effects of the rise of digital and **platform capitalism** are the reduction in the need to work (resulting from the blurring of work and free time) and the relaxed relationship between work and wages, as well as the corrosive effect of information goods, the ability of the market to create commonly agreed upon prices, and the spontaneous rise of platforms that allow for peer-production as well as self-organizing communities to emerge. All of these things make collaborative endeavors more possible.

POST-FORDISM **Post-Fordism** is a reaction to the crisis of **Fordism** in the 1970s. Rather than the end of work—an idea promoted at that time—post-Fordist production instead has led to work without end as the distinction between the workplace and home life became blurred. It is characterized by flexible specialization that allows firms to adapt to the changing marketplace by being able to produce small batches of new products rapidly.

Instead of manufacturing generic goods, post-Fordist labor produces specialized objects for different groups of consumers, like the luxury market,

and commodifies products normally outside Fordist production like emotions, feelings, and **affect**.

According to Paolo Virno, in an interview published on the website Copyriot, by using the term "**post-Fordism**" he means characteristics related to a whole workforce consisting of:

> The ability to react in a timely manner to the continual innovations in techniques and organizational models, a remarkable 'opportunism' in negotiating among the different possibilities offered by the job market, familiarity with what is possible and unforeseeable, that minimal entrepreneurial attitude that makes it possible to decide what is the 'right thing' to do within a nonlinear productive fluctuation.

Additionally, **Post-Fordism** is characterized by the increased use of information and communication technologies operating in the reticular communicative space of the virtual enterprise, resulting in the turn toward the global marketplace. According to Virno, in T*he Grammar of the **Multitude***, key to the difference between the Fordist and post-Fordist factory is the importance given to the communicative faculties of the laborer. In the Fordist factory, labor is mute, carried on by minions in silence, whereas in **post-Fordism**, laboring consists of a chain of linguistic acts and assertions. The raw materials of labor, which it assembles, are, rather, knowledge itself along with the **cultural** and social relations at its disposal. Furthermore, post-Fordist labor incorporates and includes those abilities learned in the "**social factory**" of life in the contemporary metropolis before entrance into the workplace as such; characterized by "uprootedness, the perceptual shocks of technological mutations, even by video games and the use of cellular phones." The feminization of the workplace is another consequence of work with digital technologies, which gives the mind precedence over the strength of the laboring body.

POSTHUMANISM Humanism, **Posthumanism** and Transhumanism map out a network of recently evolving concepts pertaining to the concept of what it means to be a universal idealized human in **cognitive capitalism**. Humanism erupts out of the Enlightenment and represents the first stage of a process in which the central role of a heavenly deity is jeopardized and replaced by that of the earthly man; promised perfection through reason and rationality. Humanism highlights the **agency** of humans both individually and collectively to use thinking and evidence to make decisions rather than dogma, religion or superstition. But the abominations of humanism as manifest in its role in colonialism and slavery implied that it had a dark side that betrayed its founding principles. As Rosi Braidotti, in her videotaped lecture "Posthuman, All Too Human," at Durham University in January 2017 understands too well.

Humanism as a civilizational model generates its reaction in a **posthumanism** that has a number of characteristics including the following: First it rebukes humanism's exclusive European and patriarchal character. Second it decenters the primacy of the anthropocentric and hierarchical model, the so-called ontological primacy of the human, replacing it with a more distributed model that understands man's place in the global ecosystem amongst equals which include animal, artificial life and even aliens. Finally, taking into account the instability of the category of human and its oppressive **nature**, this reaction invokes another, inclusive humanity which embraces otherness and goes so far as to create an alternative to humanist oppression such as insurgent **posthumanism**, and Afrofuturism.

A related but not synonymous term to that of

posthumanism is transhumanism, which claims to perfect this notion of the rational human being in order to create superintelligent alternative humans through acceleration of enhancement technologies. (There's a substantial political difference between the two, in that **posthumanism** has a built-in political critique component, while transhumanism is the proudly embraced doctrine of all sorts of firms offering "enhancements" to the wealthy individuals of the future.) In **cognitive capitalism**, where the brain and mind are the new factories of the 21st century, more and more of humanity's mental capacities are outsourced to robots, and premeditated algorithmically described apps, as well as subsumed by assigned corporate identities generated through data collection, so called corporate neo-humanism. The pressure of this new economy upon the human brain and mind and the new requirements necessary to function optimally in the new capitalism is intensified. Not only must the brain-mind be augmented to keep up with the ever-increasing amount of available information and data which concerns it and to function in the attention-dys**attention economy** but it must be able to keep up with the pace of information flows which are occurring at the speed of thought itself. Part of the decentered human in humanism concerns the definition of what the brain is and is not. It is no longer intracranial but embodied and extended and its connection to the environment and culture is not only anthropocentric but is ecosophic, as originally described by Arne Naess, the father of deep ecology, which respects other beings and destabilizes man's dominant role in the ecosystem. Inherent to this understanding is that the brain is becoming and evolving, not a crystallized and stable entity. As such technologic acceleration and Post-Anthropocentrism impacts the brain and mind as well. As Joel Garreau (quoted in Cary Wolfe's book *What is **Posthumanism***) understands,

future humans will attain "basic capacities that so radically exceed those of present humans as to no longer be unambiguously human by our current standards."

POST-WORKERISM or POST-OPERAISMO **Post-*operaismo*** evolved out of *operaismo* (Italian: **workerism**), and the autonomous movement during the 1980s and 1990s. It focuses on new, so-called "immaterial" modes of production and the end of the law of value. It became interesting to a younger generation, who published their reflections in the journal *Altreragioni* in 1991. **Post-Workerism** analyzes the **precarity** of the labor force as it is molded by new technology in which the massified worker is replaced by the solitary, unwaged, part-time worker without a working space who can determine his or her own rhythm. The only advantage for the worker in **Post-Workerism** is that they can exist independently from a quasi-feudal employer, but, as Sergio Bologna points out in his article, "**Workerism** Beyond **Fordism**: On the Lineage of Italian **Workerism**" (2014), this comes at the cost of being able to organize collectively and negotiate with an employer. The key to this transition from **Workerism** to **Post-Workerism** concerns the predominance of **immaterial labor** over all other forms of laboring. **Immaterial labor** becomes the dominating force in the process of subjective formation.

PRECARITY **Precarity** describes the condition of labor in **post-Fordism** and **cognitive capitalism**. In these regimes, the conditions of a worker's life become destabilized, uncertain, and angst-ridden. **Precarity** relates to the disintegration of fixed employment and social bonds; there is an abundance of connectivity, but a dearth of collectivity. (In a less elegant and more deliberately American idiom, this is of course what David Graeber means by 'bullshit jobs' in his recent book of that title.) The role of metadata in labor organization demonstrates how precariousness

comes into being. Metadata tracks the worker's daily activities and depersonalizes the worker through the use of **algorithms**. In the near future, such **algorithms** will map work schedules in accordance with a multiplicity of trends such as weather patterns, public relations events, and the illness patterns of colleagues. This will make it impossible for workers to schedule their own time.

Precarity also defines a syndrome of virtual **memory** displacement, in which the subject can no longer distinguish real memories—experienced through the interactions of the subject in what has been labeled in the past as the "natural world," from those that are virtual and man- or machine-made. The latter are engineered ergonomically to have the greatest effect. What Paul Virilio calls "phatic stimuli." As well as being nearly omnipresent these stimuli occur simultaneously on multiple media platforms including billboards, television, and the Internet, especially on social media platforms like **Facebook** and **Instagram**. As such, these virtual stimuli induce repetitive, intense, highly-networked memories that more successfully compete at neural synaptic junctions inducing neural plastic changes of **long-term potentiation**. As a consequence, these virtual memories develop greater valency as well as **saliency** in the field of play in **the mind's eye** of **working memory**.

PRIMARY REPERTOIRE "**Primary repertoire**" is a term invented by Gerald Edelman to describe the brain's architecture and **variation** at birth. It is the material substrate of the brain as the **neural zoe** in its unformed state, and it consists of **neurons** and networks resulting from the genetic expression of the shared gametes of the sperm and the egg, the conditions of the womb during gestation, and, finally, the history of our animal ancestors which are included in the evolution of its present-day form. Through its interactions with the political, social, psychological, and economic environment— in this case, the information and knowledge economy —the brain's neural architecture is modulated to produce the **secondary repertoire** or neural *bios* (or politicized brain).

PROLETARIAT According to Karl Marx, the **proletariat** is the only class capable of revolutionary action to topple capitalism. Marx, who studied Roman law, borrowed the term *proletarii*, a Roman social class constituted by citizens who owned no property and whose main activity was raising a family. For Marx, the **proletariat** described laborers in industrial capitalism who owned no property and whose worth was designated by their labor-power in the production of material goods. Now that the brain and the mind have become the new factories of 21st century in **cognitive capitalism**, the **proletariat** has transitioned to the "**cognitariat**," a class that performs **immaterial labor** to produce knowledge, communication, and **affect**. Of course this distinction is a fuzzy one as the marketplace and the workers who populate it are not so homogenous. Labor and the laborer are many times performing both physical and mental labor. However the general trend is towards the subsumption of physical labor by cognitive labor.

PSYCHEDELIC DRUGS **Psychedelic drugs** are a class of drugs which alter cognition and perception. They are by and large serotonin agonists and stimulate the 5-HT 2a receptor along with specific ligands on the post-synaptic membrane to cause a cascade of reactions in the post-synaptic **neuron**. It is this cascade that is responsible for their hallucinogenic effect. According to Ede Frecska, in his article "The Therapeutic Potentials of **Ayahuasca**: Possible Effects against Various Diseases of Civilization" (2016), **ayahuasca** beyond its hallucinogenic capacities has neuroprotective, neuroregenerative and immunological effects. In **cognitive**

capitalism, **ayahuasca** works on both the intra-cranial brain, through direct synaptic action, and the extra-cranial brain through estranging the digitial interface with which it interacts. Subjects under its effects create alternative digital profiles which subvert the capacity of the Net to track and compose them as a digital subject.

PSYCHOGEOGRAPHY Guy Debord and the Situationist International invented the term **psychogeography**, along with ***dérive*** and ***détournement***, in order to defamiliarize the subjective experience of the designed urban space in contradiction to the positions of Le Corbusier. **Psychogeography** describes the effects of the geographical environment on the emotions and behaviors of individuals, and the means with which to explore the effects of urban space on behavior. At its core, it is an experimental approach meant to discover a point where geography and psychology collide. According to Merlin Coverley in his book, ***Psychogeography*** (2006):

> The emotional and behavioral impact of urban space upon human consciousness is to be carefully monitored and recorded, its results used to promote the construction of a new urban environment that both reflects and facilitates the desires of the inhabitants of a future city, the transformation of which is to be conducted by those people skilled in psychogeographical techniques.

PSYCHOPATHOLOGIES OF COGNITIVE CAPITALISM

The **psychopathologies of cognitive capitalism** are an assemblage of psychopathologies resulting from the unique pressures **cognitive capitalism** imposes upon the "soul at work." The contemporary subject—or cognitarian—is subjected to new demands that stress the capacities of the spirit. Examples of such pressures include the overwhelming acceleration of the new technologies at our disposal, the need to allocate massive

amounts of attention to tasks, the precariousness of life and work, and **real subsumption** (an entire lifetime dedicated to work). In response to these pressures, certain cognitive and psychic disabilities are more prevalent today, while others are less so. As Jason E. Smith writes in the introduction to Franco "Bifo" Berardi's, *The Soul at Work: From **Alienation** to **Autonomy*** (2009), depression and panic have become widespread, a result of the social brain's inability to manage flows of information. This is not, he conjectures, a slowing down or drying up of desire, but structural sabotage. An inordinate amount of **alienation** also inhabits the postindustrial domain as a side effect of the fractalization inherent in digital and precarious **immaterial labor**. To this group of afflictions, one can also add attention deficit disorder (ADD), which arises from the need to process the excessive amount of static and dynamic images filling today's screens and multimedia environments. Autism which includes Asperger syndrome, is also included in this group because of its preponderance in the children of workers employed in Silicon Valley. Dr. Daniel Geschwind, a neurogeneticist at the University of California Los Angeles, suggests that this may be due to the social possibilities opened up in the tech industry for people with this syndrome, or, as Simon Baron-Cohen has proposed, it may be the result of "assortative mating."

In his book *iDisorder: Understanding Our Obsession with Technology and Overcoming Its Hold on Us* (2012), Larry Rosen adds two more psychosocial disorders that can be added to those mentioned above: 1. Obsessive-compulsive disorder in which we are constantly checking our **Facebook** and email. 2. Narcissistic personality disorder as we attempt to create a perfected on-line persona through intimate pictures of our lives and selfies. Summarizing Rosen's work, Jon Lindblom in his essay, "Late Capitalism and the Scientific Image of Man: Technology,

Cognition and Culture" (2105) remarks that these syndromes are accompanied by neurological configurations that remarkably mimic those that accompanying substance addiction like alterations in the levels of neurotransmitters like dopamine and serotonin as well as stimulating neurotrophic and neuroplastic responses at synaptic junctions that result from epigenetic responses to new technological environments.

PSYCHOPOLITICS **Psychopolitics** exemplifies a median point intervening between biopolitics and neuropolitics or **biopower** and **neuropower**. It substititutes a boipolitical regime for a neoliberal one by substituting the body for the soul. As Byung-Chul Han suggests **psychopolitics** is neoliberalism's favored form of government. For him biopolitics is not suited for the neoliberal regime as it has no access to the psychic realm. As a mutated form of capitalism it is not concerned with the somatic or corporeal but the psyche as the site of productivity. Accordingly self-optimization is its mantra in order to produce an optimized and perfectly functioning human being laborer entangled with the new information and knowledge economy.

RAP **Rap** is a form of music that evolved in the 1970s primarily through the efforts of urban Black musicians and DJs. Generally acknowledged to have originated in the Bronx, in New York City, **rap** music's initial form borrowed elements of disco and spoken word **poetry**. Clive Campbell, known professionally as DJ Kool Herc, used a two-turntable set-up to extend the break beat of popular records and spoke rhythmically over the beat to enliven the dance floor. Thus, the familiar "two-turntables and a microphone" structure that defined early **rap** was born. After entering the mainstream of popular music *via* references in the song, "Rapture" (1980), by the New Wave-influenced pop group, Blondie, the popular film, *Wild Style* (1983), and the work of early crews like Run DMC, The Sugar Hill Gang, The Cold Crush Brothers, and Grandmaster Flash and the Furious Five, **rap** is now one of the most popular genres of music. Along with graffiti and breakdancing, **rap** is considered the third key element of the **emergence** of early "hip-hop culture."

REAL ABSTRACTION **Real abstraction** takes on a new meaning in **cognitive capitalism**—one that significantly differs from its historical precedents. It is a condition of exchange value and the fractionalized division of labor, so-called "labor time." According to Michael Taussig in his book, *The Devil and **Commodity Fetishism** in South America* (1980), industrial capitalism requires that the productive capacities of humans and the resources of **nature** are organized and rationalized in accordance with cost accounting. As human life is broken down into smaller and smaller components, itemized units such as labor time can be bought and sold on the market. Although this relationship has become so normalized as to appear real—hence, "**real abstraction**"—it is simply a social construction. In **cognitive capitalism**, it extends Alfred Sohn-Rethel's idea that the commodity fetish—through its real use in social exchange, and its use as psychological metaphor—forms the very foundation of thought and cognition. In his article, "**Real Abstraction** Revisited: Of Coins, Commodities, and **Cognitive Capitalism**" (2008), Alberto Toscano argues that the concept of the commodity has changed from a focus on objects and their value to a focus on codes, paralleling the displacement of a **disciplinary society** by the **society of control**. In this glossary, we posit that these abstract processes become extended and internalized conditions of the material brain as neural epigenetic epiphenomena. This argument is echoed in the burgeoning fields of study concerning **artificial neural networks** and **deep learning**, where the **retina** becomes

a model for parallel processing that will form the core relation between machine-to-machine learning.

REAL SUBSUMPTION **Real subsumption**, as opposed to **formal subsumption**, best characterizes the notion of labor in **cognitive capitalism**. It is sometimes also called the "**social factory**," the "diffuse factory," or the "**factory without walls**." All aspects of life, even our purported leisure time, constitute work within **cognitive capitalism**. Labor is no longer restricted to a specific place or interval of time, as it is in **formal subsumption**. Instead, the logic of labor has diffused into every fiber of our beings and is now thought of in terms of a lifetime or lifespan. As Jonathan Crary writes in his book, ***24/7****: Late Capitalism and the Ends of Sleep* (2013), sleep is the last refuge from **real subsumption**. From a spatial perspective, **real subsumption** deterritorializes the concept of the worker sequestered in the factory, and work becomes distributed throughout the social *habitus*: from the office, to the café, to the home.

RECEPTIVE FIELDS **Receptive fields** correspond to physiologically determined areas of response, for instance, between a particular **retina**l ganglion cell **neuron**, a designated field of illumination, and either a rod or cone. This receptive field is then carried throughout the entire visual system, from the eye to the brain. A specific segment of the visual field is retinotopically represented on a circumscribed area of the occipital cortex. A circle of light either enhances or inhibits signaling from the cell. In "on" **retinal ganglion cells**, a small centered circle or spot of light can induce an "action potential" when that spot is limited to the center of the field, surrounded by darkness.

RECUPERATION **Recuperation**, as understood by Luc Boltanski and Eve Chiapello in their book, *The New Spirit of Capitalism* (1999), designates methods operating in late capitalism, in which forms of liberation, especially artistic critique, become reintegrated into modes of "engagement" that are, in fact, new forms of repression. According to the authors, capitalism attracts actors who feel they have been oppressed by offering them forms of emancipation that mask new forms of oppression. Artistic practices generated from the desire for freedom actually create the heterogeneous **cultural** artifacts and ideas that generate capitalism's new and expanded markets. Capitalism thereby subsumes artistic production for its own gains.

REDISTRIBUTION OF THE SENSIBLE AND INSENSIBLE (RE-DOSI) In accordance with the ideas of Jacques Rancière, the **redistribution of the sensible and insensible** delineates the means by which delinked artistic practices mutate and destabilize the conditions of consumer ecologies, both at the sensible and insensible level. In his book, *The Politics of Aesthetics: The Distribution of the Sensible* (2004), Rancière proposes that our sensible environments are designed to create homogeneous experiences that organize and police our free will. According to him, artistic practices redistribute the sensible and insensible by intervening in ways of doing and making that intervene in the general distribution of ways of doing and making as well as in the relationships they maintain to modes of being and forms of visibility.

REENTRY **Reentry** is the third component of Gerald Edelman's Theory of Neuronal Group Selection, or "**Neural Darwinism**," outlined in his book, *Second **Nature**: Brain Science and Human Knowledge* (2006). It describes an ongoing recursive process through which ongoing parallel signaling—either phasic or continuous, between separate contiguous or noncontiguous neuronal maps in the brain—leads to

temporal correlations reflected as units of selection called "neuronal groups." **Reentry** is an intra-cerebral process in ongoing signaling that occurs back and forth between different areas of the brain.

According to Edelman in an article entitled, "Naturalizing Consciousness: A Theoretical Framework" (2003), as a result of the correlations **binding** enacts between neuronal groups, those that synchronously fire as ensembles together over widely distributed areas of the brain within prescribed intervals of time are selectively favored over those that do not resonate in such a manner. **Reentry** supplies a solution for what is called, in neuroscience, the "**binding** problem" in which functionally segregated areas of the brain correlate their discharges together in the absence of an executive program, like an improvisational orchestra that lacks a conductor. Or what Immanuel Kant called the 'transcendental unity of apperception.' **Binding** is a process that solves what is referred to as the question of "perceptual categorization," the selective discrimination of awareness toward different objects and events. It is one of the processes responsible for the seamlessness and unity of appearance of consciousness.

REGIMES OF TRUTH Michel Foucault, in his essay, "Truth and Power" (1977), addresses the concept of truth stating that truth is not about "changing people's consciousness – or what is in their heads – but the political, economic and institutional regime of the production of truth." Key to Foucault's thinking is the goal of releasing and emancipating truth from forms of hegemony. Truth, for him, must be understood as a "system of ordered procedures for the production, regulation, distribution, circulation and operation of statements." The essential political problem, then, is not to criticize a particular ideological condition, but, rather, the constituting of a new politics of truth to displace an older one.

Of significance for us today in our Internet society dominated by 24-hour news cycles and social media as a news source is what is referred to as post-truth politics or post-factual politics and post-reality politics, which displaces **regimes of truth** with such things as **fake news**. According to an article published in *The Guardian* on November 15, 2016 by Alison Flood entitled, "Post-truth named word of the year by Oxford Dictionaries," it was Steve Tesich who coined the phrase in its current meaning in an article in the *Nation* in 1992. In post-truth politics, expert opinion and objective facts are considered of secondary importance relative to emotional and affective appeal in shaping personal beliefs.

RETINA The **retina** is a photosensitive membrane, made up of layers of cells, covering the inner spherical surface of the eye. One might call it the "film" of the eye, activated, like analog film, by photons of light. The **retina**'s rods and cones are essential for seeing. Rods are peripherally displaced and extremely sensitive to light; they are especially utilized in dark conditions. Cones are responsible for color vision in daylight and for finely focused vision. They are centrally located, especially in the areas of the macula and fovea. **Retina**l pigment epithelium, horizontal cells, bipolar cells, and amacrine cells make up the rest of the **retina** and primarily function to refine the output to the lateral geniculate nucleus through the **retina**'s **ganglion cells**. If you wanted the art connection you could say something about Duchamp and the **retina**.

RHIZOME In contradistinction to the root of a tree—in which one element becomes two—the **rhizome**, which is characteristic of many weedy plants, consists of very complex root systems. The **rhizome** analogy has been used to describe a means by which information and

energy are transmitted according to a network. In *A Thousand Plateaus* (1980), Gilles Deleuze and Félix Guattari describe **nature** through the metaphor of complex, branching taproots, which are multiple and cyclic in **nature**. This metaphor transforms the world-image from "root-cosmos" to "radicle-chaosmos." There are many examples of **rhizomes**, including subterranean stem systems of bulbs and tubers, some animals in pack form, and the nervous system, with its network configuration and degeneration.

RHYTHMANALYSIS **Rhythmanalysis** is a concept that developed and expanded through the work of three philosophers: Lúcio Alberto Pinheiro dos Santos, Gaston Bachelard (who defined the term), and Henri Lefebvre (who authored the seminal work, ***Rhythmanalysis:*** *Space, Time and Everyday Life* (1992)). **Rhythmanalysis** is the discovery that the sensible is in constant motion, expressing a multiplicity of rhythms that form "polyrhythmia." Rhythms can be classified into a number of categories: secret rhythms of the physiological and psychological kind, public and social rhythms, fictional and imaginary rhythms, and, finally, dominating-dominated rhythms. Lefebvre worked to develop a field of knowledge around the concept of rhythm, especially one with practical consequences for understanding time as a form of repetition. His analysis examines time and space in relation to the social becoming of everyday life.

RHYTHMS IN THE BRAIN **Rhythms in the brain** are oscillatory patterns recorded from electrodes linked to an electroencephalography device (EEG) located on the scalp or inside the brain. The most common patterns consist of alpha, beta, gamma, delta, and theta bands. The alpha band (8-15 Hz) is the dominant band for a quietly resting individual. When you open your eyes, an alpha blockade occurs and you manifest beta (15-25 Hz) and gamma bands (30-100 Hz). Beta rhythms are related to active concentration while gamma waves have been linked to a unity of consciousness where the world picture appears as a seamless whole. The delta band, occurring during drowsiness and sleep, is manifest at 1-4 Hz. Theta rhythms are recorded from intracranial electrodes and reveal an ongoing oscillation from the hippocampus and surrounding structures (which ranges from 4-7 Hz), which is linked to cognitive processes such as **working memory** and navigation. Gamma oscillations were discovered by broadcasting spike discharges over a loudspeaker that revealed a steady woosh as a background to the intermittent crackling **noise** of action potentials. The properties discovered in the experiment revealed that some cortical **neurons** fire periodically, with regularities broadly distributed between 30 and 70 Hz, with a peak occurrence at 40 Hz. These were named "gamma oscillations" and were found in the visual cortices of cats by Charles Gray and Wolf Singer. Using visually-evoked potentials, scientists discovered that the gamma band represents the formation of a visual percept based on a coalition of **neurons** firing at 40 Hz. In 1990, Francis Crick and Christoph Koch asserted that 40 Hz oscillations in a subset of **neurons** coding a specific object is a signature of what they refer to as a **"Neural Correlate of Consciousness," or NCC**. In later years, they have modified this view and understand it as a temporary state, which assists a nascent coalition in competition with other coalitions. The "winning" coalition emerges and represents the content of consciousness at a given moment. Koch states, "[t]his dynamic process can be compared to politics in a democracy with voting blocs and interest groups constantly forming and dissolving." Thus, **NCC** is built on the sequential appearance of explicit neuronal representations.

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SALIENCY **Saliency** can be understood as a kind of internal attention, in which selected elements of one's scenario visualization, existing in **the mind's eye** and part of **working memory**, are highlighted, and, are given further analysis. It consists of two integrated systems: a bottom-up system engaged with the incoming stream of sensory data that is fast, automatic, and based upon a stimuli's perceptual features, and a top-down process consisting of the reflections of a large-scale network—made up of the prefrontal cortex, insula, and dorsal anterior cingulate cortex—that modulates this incoming stream based on the past experience of the subject, as well as his or her internal state. Some authors, such as Stefan Treue, in his article, "Visual Attention: The Where What, How and Why of **Saliency**" (2003), state that the systems may not be seamlessly integrated, but rather split up into two interacting networks in the brain. For instance, they speculate that the streaming sensorial bottom-up information is synchronously combined with the top-down attentional information to create a **saliency** map in which stimuli in the environment and the **retina**l image that are deemed most relevant guide gaze shifts emanating from, for instance, the frontal eye fields of the frontal cortex, toward those regions of interest.

SECONDARY REPERTOIRE The **secondary repertoire** is a term coined by the Nobel Prize-winning neuroscientist, Gerald Edelman, most notably in his book **Neural Darwinism** (1978), to describe the process by which synaptic modifications result from the strengthening of some **synapses** and the weakening of others, resulting from interactions with the environment; a process Edelman called "experiential selection." From the vast population of differentiated neural appendages, those most in tune with the environment will be selected in ways that are analogous to Darwinian

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natural selection. Additionally these selected neuronal groups will self-reinforce through the processes of **reentry** and **emergence**. This produces variable groupings of collectively acting neural populations that have been sculpted by the environment.

When humans were hunter-gatherers, **nature** and language were the primary forces of epigenesis. Today, these forces reside in the real world and virtual **cultural** *habitus* of, for instance, the designed urban space and the World Wide Web. Since each life is a cornucopia of different patterns of experience that lead to unique forms of neural modulation, the **secondary repertoire** across a population of human beings can produce singularities and sculpt a multiplicity. Alternatively, when governments intercede in the epigenetic process, through the production of limited and normalizing environments, the process leads to a homogenized population, or "people," that is—ostensibly—easy to control.

The theory of selective stabilization was developed by the neuroscientist, Jean-Pierre Changeux, in his paper, "Synaptic Epigenesis and the Evolution of Higher Brain Functions" (2012) and proposes a theory of epigenesis that posits that the environment plays a role in the preservation or degeneration (pruning) of labile **synapses** associated with the activities of a neural network. The state of activity is tuned through interaction with the socio-**cultural** environment, especially during critical periods of development.

SELF-ORGANIZATION In a system that has **self-organization**, new orders emerge through the interaction of its elements. Importantly, the sum of these interactions is greater than its component elements. According to Francisco Varela and Humberto Maturana in their article "Autopoiesis: The Organization of Living Systems, Its Characterization and a Model," living systems are autopoietic or self-producing and self-making, and

consist of linked components assembled together through spatial relations and processes in a web of distributed feed-forward and feedback loops. Together these produce a unity or set of parameters that influence the system's coherent behavior and sometimes function spontaneously at critical values far from equilibrium. What is important is that assemblages of elementary units together produce networks that give rise to novel properties beyond the capacity of the sum of the components alone and this is the key to **emergence**; that is to say new properties emerge from the interaction of the networks components. In the brain, according to Varela and his collaborators Evan Thompson and Eleanor Rosch in *The Embodied Mind*, emergent properties are fundamental to the operation of the brain itself:

> It has, therefore, become increasingly clear to neuroscientists that one needs to study **neurons** as members of large ensembles that are constantly disappearing and arising through their cooperative interactions and in which every **neuron** has multiple and changing responses in a context-dependent manner. (Varela, Rosch and Thompson 1991)

How might this happen? It appears that specialized dormant substructural events or rules latent in the network can become transitorily revitalized and influence the moment to moment coherence of neural activity constituting the network.

According to J. A. Scott Kelso, in *Dynamic Patterns: The **Self-Organization** of Brain and Behavior* (1995), **self-organization** is key to understanding how the brain is a pattern-forming system governed by possible and discoverable nonlinear, dynamical laws. For instance, behaviors such as intending, perceiving, learning, acting, and remembering are, in fact, the result of metastable, spatiotemporal patterns of neural activity centered in the brain, which arise from cooperative interactions between neural clusters.

SEXED BRAIN The **sexed brain** is the continued belief that structural disparities in the brains of men and women reflect innate differences engendered in the sex chromosomes. This assumption is based on the archaic belief of biological determinism. Recently the role of **neural plasticity**, epigenesis and **cultural** diversity has questioned the importance of biological determinism in favor of socio-culturally mediated determinism.

SHAMAN A **shaman** is defined in a number of ways, but the term can refer to anyone with the power to enter into what they understand to be contact with spirits of the underworld while being in an altered state of consciousness. He or she is a socially designated specialized practitioner. This journey into alternative realities is made at the behest of others in order to heal a rift between the temporal and spiritual worlds. **Shamans** are mediators who operate on behalf of their communities; together with spirit guides, they are able to communicate between the living and the dead to resolve unsettled issues. They are, however, distinguished from other mediums by their unique techniques. Their ability to cross over to the "other side" is the result of having undergone a shamanic trial of the "wounded healer"—that is, becoming ill and close to death in order to understand illness. Functionally, a **shaman** can also be seen as a priest.

SHAMANISM Michael Taussig, in his book *The Devil and **Commodity Fetishism** in South America* (2010), recounts many stories in which **shamans** are summoned to administer various religious ceremonies

between the living natural world and spirit world. **The shaman** goes out to meet the spirit, the spirit does not come to take over his body. Spirits of the inorganic natural world held by stones, trees and other objects can converse between themselves and with humans only with the help of a shaman. Today **shamans** administer ayahuasca ceremonies to Europeans visiting such countries as Peru. The Internet is not a totally optimized domain although its stacks and programs withhold its entropy and conditions of alterity. The 21st century **shaman** is a medium who links this underbelly of the network to the spiritual reserves of **nature**. Although **nature** is being destroyed, its ghosts and specters are still very much present.

SIMULACRUM In *Simulacra and Simulation* (1981), Jean Baudrillard identifies three orders of **simulacrum**. The first order **simulacrum** is clearly a copy of the original or a forgery. The representation is clearly a hand-crafted placeholder for a real item. The **memory** resulting is therefore referred to as authentic. There is no difficulty in distinguishing the two. Both can be easily called up by **working memory** in **the mind's eye** separately where they remain discernable in what Gilles Deleuze calls the image of thought. The second order isassociated with the Industrial Revolution and marks the first moment when the relation between reality and representation begins to break down due to mass production of copies and their subsequent commodification. This process of commodification threatens the authority of the original as the image/copy becomes an equal or even better placeholder for the real. This first order dynamics referred to as the **simulacrum** focuses on "real" counterfeits, while the second order is associated with production and prosthetic **memory** as the **memory** is not derived from the person's real experience. The third order is a production of late capitalism

or postmodernism as the distinction between reality and representation disappears. The sign pretends to be an adequate copy but in actuality refers to no original. It generates a third form of **memory** described as irreal **memory**.

In the new **information economy** simulation is entangled with the **political economy** as it governs **valorization** consisting of the massification of attention regulated by sign-signifier relationships no longer tethered to the reality principle.

SINGULARITY or TECHNOLOGICAL SINGULARITY The **singularity** refers to a concept first suggested by John Von Neumann, in which an accelerated technological progress will lead to intelligent machines more intelligent than humans and capable of designing their own software, something referred to as recursive self-improvement. We humans have the capacity to run simulations in our head according to human analytic and logical constructs. It is this ability that allows us our advantages over animals. By reproducing these capacities for simulation as software, running in networked machines a thousand times faster than our own and according to a machinic logic, we open up the door to regimes of intelligence as different to our own as ours are different from those of animals. So different in fact as to be unfathomable to our human based systems. Importantly this abundance of superintelligent machines will continue to improve themselves, within the confines of the laws of physics, to the point of designing themselves, something referred to as machine to machine learning, in the end, creating their own world as a result. The **technological singularity** will all of suddenly occur as a result of exponentially increasing processing power, for instance, according to **Moore's law**. Eventually this will lead to the end of the human era in and life as we know it. It is this

super-acceleration of intelligence by machines based on their own needs rather than human needs that lead to the intelligence explosion that instigates the **singularity**. Ray Kurzweil predicts the date of the **singularity** to be 2045, reserving the term specifically for only **artificial intelligence**, although Jaron Lanier refutes the idea because he does not believe in technological determinism and that technological progress is an autonomous process, believing instead that it follows the power of human **agency**.

SIMULTANEITY OF INPUTS The **simultaneity of inputs** model is an essential component of associative learning and **memory**. It proposes that after a **neuron** is simultaneously stimulated by two or more concomitant stimuli, that **neuron** will fire in response to any one of those inputs.

SOCIAL FACTORY (FACTORY WITHOUT WALLS) The **social factory** or "**factory without walls**" is a concept first developed by Mario Tronti in his essay, "Factory and Society," in 1962. He writes:

At the highest level of capitalist development, the social relation is transformed into a *moment* of the relation of production, the whole of society is turned into an *articulation* of production, that is, the whole of society lives as a function of the factory and the factory extends its exclusive domination to the whole of society.

This is key to understanding the concept of **real subsumption** when life itself becomes work.

SOCIETY OF CONTROL The **society of control** is a concept developed by Gilles Deleuze in his "Postscript on the Societies of Control" (1992). Understanding that the system of enclosures described by Michel Foucault as the "**disciplinary society**" was in crisis, Deleuze developed a new concept based on something Foucault himself had suggested but not developed in full. In the **society of control**, older disciplines operating in a closed frame are supplemented by ultra rapid, free-floating forms of control based on modulation: the resulting state is contin- uously changing from one moment to the next. Codes and passwords allowing and preventing access to information are particularly important within this system.

STATISTICON The **Statisticon** describes the immanent effect of cognitive labor and **big data** on the brain's **neural plasticity**. As its names suggests, it is the result of the action of statistics and **algorithms** to normalize **contingency**, chance, and, therefore, future choice. In my essay "**Epigenetic Architecture** and the **Statisticon**" (2016), I described it as the central node at the heart of a complex network composed of multiple streams, including algorithmically derived smart and sustainable architecture and urban design; the **Internet of things (IoT)**, the **Internet of Everything (IoE)**; **neural capitalism** and neural technology; processes of valorization—which include branding and public relations—neural consumerism and neural economics, and the technologies of **affect** integrated into various—primarily virtual—media. Together, all these streams conspire, either consciously or unconsciously, to normalize the concept of the body and brain in its extended and embodied sense. The **Statisticon** and surveillance capitalism are related to and reflect upon each other.

SUBALTERN The idea of the **subaltern** as a term in philosophy originated with Antonio Gramsci. The term derives from a designation of rank in the British Army designating a junior officer. In the philosophical context, the term designates a person of the lower classes who is rendered without **agency** by social dynamics. The **subaltern** is positioned outside the hegemonic

power structures of the colonial homeland. Gramsci's meaning of the term has been used by a variety of postcolonial thinkers including Gayatri Spivak, Homi Bhabha and others. The concept of "**subaltern cosmopolitanism**" derives from this term. Developed by Boaventura de Sousa Santos and César A. Rodríguez-Garavito, it expresses an alternative aspect of **cosmopolitanism**, placing the focus on forms of resistance carried out by the poor and excluded to subvert hegemonic structures and create alternatives.

SUBJECTIVIZATION **Subjectivization** concerns the different means by which subjectivity is produced in a **disciplinary society**, its postmodern manifestation, the **society of control** and its present context as the **STATISTICON** in late cognitive or **neural capitalism**. In all of these systems, subjectivity is not pre-given and is, instead, socially constructed. In the **disciplinary society**, two aspects of this process are particularly important. First, as Michael Hardt and Antonio Negri argue in their book, ***Empire*** (2000), subjectivity is in a constant state of becoming; in other words, it is a constant *social* process. Secondly, institutions such as the classroom, the church, and the department store provide discrete places where this process is enacted.

In the postmodern, quasi-imperial world, **subjectivization** is quite different. The process now takes place across the entire social terrain as formal subsumption has been replaced by **real subsumption**: we are always working, and work forms the very core of our becoming. In **cognitive capitalism**, it is the **neural plasticity** that is being commoditized by **Big Data** and the **Big Other** which constitute the data sovereign, as we move into **neural subsumption**. The brain, in its extended intracranial and situated extra-cranial sense is constantly shaped and reshaped, territorialized and reterritorialized. **Subjectivization** reenacts the delicate

relationship between the brain, body, world, and mind, and the processes of normalization, governmentalization, and emancipation.

SUPERINTELLIGENCE According to Nick Bostrom in his essay "Ethical Issues in Advanced **Artificial Intelligence**" (2003) it is important to understand that **superintelligence** is not just another technological tool to incrementally improve human capabilities but is radically different. First of all he introduces the idea of **superintelligence** as "any intellect that vastly outperforms the best human brains in practically ever field, including scientific **creativity**, general wisdom, and social skills." This definition does not describe how this **superintelligence** is implemented and he suggests that it could be maintained in a digital computer, an ensemble of networked computers or in cultured neural tissue or something else not yet even identified. Excluded from this definition, he goes on to say, are various intelligent entities that don't meet these qualifications such as Deep Blue, which is not **superintelligence** because it is only smart within a limited domain and within its limited range it is not vastly superior. Corporations and the scientific community are also not **superintelligence** because even though they can accomplish intellectual feats that no individual human can they are not adequately integrated to count as intellects.

In the second part of the essay he goes on to list the defining and unusual characteristics of **superintelligence** that set it apart as something different. I will copy them here:

Superintelligence *may be the last invention humans ever need to make*. It may be better than humans in doing scientific research or in inventing new technologies on its own.

As a result of 1. Technological progress in all other fields will be accelerated by the arrival of advanced

artificial intelligence.

Superintelligence *will lead to advanced* ***superintelligence****.*

Artificial minds can be easily copied, as long as there is hardware to store them. As a result of the speed with which they can be copied multiple copies can exist simultaneously perhaps in one place as a super-intellect.

Emergence *of* ***superintelligence*** *can be sudden.* The sudden occurrence of **superintelligence** with radical implications may be a matter of days not years. This event is referred to as the **singularity** hypothesis.

Artificial intellects are potentially autonomous agents. As such you should not think of them as potential tools as they may be capable of independent initiative.

Artificial intellects need not have humanlike motives.

Artificial intellects may not have human like psyches.

SUPERORDINATE PRECARIAT The term **superordinate precariat** refers to a subjectivity in which the exaggerated conditions of isolation and **24/7** digitality, during the COVID-19 pandemic, accentuate already ongoing trends with regard to digital interaction. As a result of this intense interaction with digitality this sub-category, used to describe an aspect of the **cognitariat**, hypertrophies to become a subject designation all its own. The compound phrase **superordinate precariat** is used here to distinguish it from its earlier forms. Furthermore, today and in the near future it will describe a form of subjectivity yet to come, in which we are all linked in a network command system called the wired brain.

SURPLUS JOISSANCE Joissance in Lacanian parlance refers to the means to go beyond the pleasure principle through transgressions of prohibitions imposed upon a body

in thought by the ethical, moral and laboring codes of society. But in going beyond this principle into unknown territories the subject experiences doubt and pain. Lacan calls this the pain principle in contradistinction to the pleasure principle. A feminine joissance was later described. In this context **surplus joissance** is a condition of the **Brain without Organs (BwO)**. It relates to the fluid topologic uncanny of thought beyond the realm of capitalization which cannot be privatized and recuperated for profit as data. **Surplus value** constitutes the value produced by the manual laborer over and beyond his or her paid salary in Fordist and post-Fordist dominiums. Its meaning has morphed and mutated as an ensemble of relations which have evolved to constitute cognitive labor and cognitive **surplus value** keeping in mind that up to this point much of cognitive labor is silent. The time to output a conceptual artwork may be minutes, however, it may have taken three years of noodling in order to reach that point. This is a problem for **cognitive capitalism** which wants to commoditize this noodling thought. Instead of the biometrics of **Taylorism** it has embraced the algometrics of machine learning and **Big Data** to create the management technics of this dark thought. Built on a common model of optimization operating in **artificial neural networks** and neural networks based upon the power of sculpting network connectivity optimally through a synchronization of converging inputs the managerial technique of **Hebbianism** was born. Just as the ecstasy of joissance is a form of bodily release from the organization of the body, **surplus joissance** constitutes the value of the uncontrolled and anarchic unconscious neural energy now tethered to cognitive labor, in order to release it from its sovereign.

SURPLUS VALUE **Surplus value** can be absolute or relative. It is determined by the difference between the worker's labor time (the number of hours worked) and the

necessary labor time needed to cover the cost of the worker's salary or labor power. In other words, **surplus value** is equal to the new value created by workers in excess of the sum of their salaries or labor cost. The capitalist has two means at his or her disposal to increase **surplus value**: in absolute terms, they can extend the working day or reduce wages. In relative terms, they can, according to Karl Marx, intensify production, and, thus, curtail necessary labor time. Crucially, collective labor creates the sum total of **surplus value**. Collective labor can also create antagonistic actions that subvert capitalism's control of **surplus value** by increasing wages or decreasing the hours of the working day.

SURVEILLANCE CAPITALISM "**Surveillance Capitalism**" is a term coined by Shoshana Zuboff in her book *The Age of **Surveillance Capitalism**: The Fight for a Human Future at the New Frontier of Power* (2019). It refers to the end of the early, visionary prospects of the digital future and the replacement of the utopian digital dream with a future that is dark and purely commercial. Zuboff claims that rather than creating services for the good of humankind and the development of a better way of life, the Internet has mutated into a complex network of information-gathering protocols that peer into our most private lives to collect and commoditize behavioral data that will be used to predict our tastes and future behaviors, and which, without our knowing, feeds what she calls a "behavior futures market".

On the first page of the book, Zuboff defines the term **surveillance capitalism**. I will quote it in its entirety here. **Surveillance capitalism** is:

1
A new economic order that claims human experience as free raw material for hidden commercial practices of extraction, prediction and sales;

2
A parasitic economic logic in which the production of goods and services is subordinated to a new global architecture of behavioral modification;

3
A rogue mutation of capitalism marked by concentrations of wealth, knowledge, and power unprecedented in human history;
4

The foundational framework of a surveillance economy;
5
As significant a threat to human **nature** in the twenty-first century as industrial capitalism was to the natural world in the nineteenth and twentieth;

6
The origin of a new instrumentarian power that asserts dominance over society and presents startling challenges to market economy;
7
A movement that aims to impose a new collective order based on total certainty;

8
An expropriation of critical human rights that is best understood as a coup from above: an overthrow of **the people**'s sovereignty.

Zuboff illustrates the power of this new sovereign to reach down into the very roots of daily existence and life, interceding in some way or another in every nuance

of social participation. She writes: "Instead of labor, **surveillance capitalism** capitalism feeds on every aspect of every human's experience." In **cognitive capitalism** this omnivorous feeding marks the distinction between formal and **real subsumption**. Thus, I pose a question: is the new zealous pursuit of intelligent machine learning and deep AI about another, more fundamental future horizon: that of the mind and the brain? Are not the real prospects of **surveillance capitalism** the register and sculpting of the neural dispositions operating in the intracranial brain?

SYNAPSE A **synapse** is the space of communication between two **neurons**, and the site of inhibitory or excitatory actions that have implications for **memory**. The synaptic junction is about 20 to 40 nanometers wide. Chemically-mediated synaptic transmission occurs within this space. Neurochemicals contained in vesicles are released into the synaptic cleft by merging with the presynaptic membrane at active zones making up the axonal terminal. The chemicals flow through the space to adhere to active sites situated along the postsynaptic membrane, where they cause depolarizations or hyperpolarizations. Electrical transmission is also possible across special **synapses** called "gap junctions."

SYNCHRONOUS CONVERGENCE **Synchronous convergence** is a term coined by the neuroscientist Joaquín Fuster, to explain Donald O. Hebb's theory of sensory association. It states that when two inputs converge at the same time on the membrane of an output cell, they induce changes in that membrane to the effect of lowering the threshold for future transmissions of input through the output cell.

SYNOPTICON According to Thomas Mathiesen, in *The Viewer Society* (1997), the term **synopticon** offers another metaphor for the actions of surveillance, superseding its predecessor, the **panopticon**. It provides, rather, a reciprocal system of control in which the many watch the few. In the **synopticon** model, the central tower inhabited by the prison guard simultaneously watching the population of inmates is replaced by the TV or computer screen in which an audience watches a presidential debate, or the televised funeral of John F. Kennedy.

TAYLORISM **Taylorism** was a system of scientific management developed by Charles Frederick Taylor as a means to maximize worker and machine efficiency during physical labor. It serves as the foundation on which Fordist production is based by combining them together as a relationship to increase the worker's **surplus value**. For instance **Fordism** standardizes output, abstracts living labor into small deskilled tasks that were easily trained, distributed along a conveyor belt and instantly substitutable and switchable between workers in case of, for instance, sickness or absenteeism. In **cognitive capitalism**, in which the brain and mind are the new factories of the 21st century, **Taylorism** has been subsumed under principles of **Hebbianism**, placing the brain's efficiency during mental labor at stake. An assemblage of apparatuses has evolved to increase the surplus labor of the **cognitariat**. These apparatuses are engineered to interact with the neural predispositions and active architectures of the brain, and the mind, to optimize functioning while at work. They include computer-designed interfaces, cognitive ergonomic platforms, and **neuromarketing**. This system of relations is ontogenetic and begins in the early postnatal period when the child begins to interact with cell phone and laptop.

TEME A **teme**, using Susan Blackmore's terminology, is a meme spread by purely technological actors. **Temes** are, thus, a new form of replicator.

TERATOMA **Teratomas** are derived from germ cells or embryonic cells. Often they are non-malignant tumors made up of cells from all three germ layers of a developing embryo. They can take on a monstrous appearance due to their unusual and anarchic display of cystic and solid parts, which can contain material like hair, teeth, and bone. Most relevant for this glossary is the use of the term by Gilles Deleuze and Félix Guattari as a metaphor to describe the **Body Without Organs**.

THEORY OF MIND In his book *How the Body Shapes the Mind* (2005), Shaun Gallagher joins the two predominate approaches of the **theory of mind**, theory theory and simulation theory, to a third one he calls "interaction theory." Theory theory is based on the assumption that at around the age of four children develop a domain-specific mechanism or module in the brain, the **theory of mind** module (ToMM), for reading minds or that they attain this ability in the course of their development through studying the feedbacked repercussions of their actions upon the social environment. According to him, "This stance involves postulating the existence of mental states in others and using such postulations to explain and predict another person's behavior." Furthermore there are two different stages. An early stage or first-order belief attribution, occurring at 4- 5 years of age in which the child distinguishes the differences between his her beliefs and that of another and a second-order belief attribution' occurring later at around 6 or 7 in which the child develops the ability to understand another person's thoughts about a third person or object. Interestingly autistic children can sometimes attain the first level although later than normal children but rarely proceed to the second level. The simulation model does not theorize about another person but rather uses one's own mental experience as a generated self-model of another's mind. Through

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learning and experience the child in the simulation model constructs a real model, which is at his or her disposal through and with which he or she can run simulations. In other words he or she simulates the thoughts and feelings of the other as if, according to Gallagher, he or she was in the situation of the other. This process of internalized enactment can remain unconscious. Importantly both theory theory and the simulation **theory of mind** depend on a Cartesian perspective of two isolated minds that need to bridge a certain mentalistic gap in order to conceptualize what the other person is in thinking. The third framework or "interaction theory" rejects many of the principles of the first two and rather and sees **theory of mind** as an embodied practice. Using a phenomenological stance Gallagher argues that the primary way of being in the world is pragmatic, characterized by action, involvement and interaction with environmentally contingent and contextual features rather than mentalistic or conceptual contemplation. Rather, explanations or actions taken are usually in response to other actions, which were called for in ways analogous to embodied adaptions in response to affordances. Instead of a response to a concrete stimulus-perceptual arrangement like the shape of the handle on a teacup for which the index finger might gravitate to in the desire to grasp the cup the affordances become socially activated, as do the affordances, which are socially constructed. Quoting Gallagher, "Our interaction with another human being is not equivalent to a detached observation (or explanation) of what the person is doing. The notion of evaluation signifies and embedded cognitive practice that relies on certain pre-theoretical embodied capabilities that 3 year olds have already developed to understand intersubjective situations ... it is more like an 'embedded reflection on possible actions.'"

TRANSPARENT ALIENATION **Transparent alienation** and **opaque alienation** result from a diffuse neurobiological inadequacy of varying degrees. These insufficiencies occur during critical periods of development, with **opaque alienation** being the more severe deficiency.

Transparent alienation can be understood through an example described by Fredric Jameson in his book, *Postmodernism or, the **Cultural** Logic of Late Capitalism*. Jameson speculates that his habits of perception, formed by high modernism, cannot comprehend the infinitely curved Riemannian spaces characteristic of postmodern architecture like the mirror cladded Bonaventure Hotel in downtown Los Angeles, designed by John C. Portman Jr. and built between 1974–1976. These perceptual habits were sculpted by a modernist, Euclidean **cultural** logic and the associated social, cultural, and political relations that supported it. This logic was imprinted on the author's developing mind. Neurobiological processes like synaptic stabilization, **apoptosis**, **reentry**, and synchronization of the neural oscillations that facilitate epigenesis were entangled with the ***gestalt*** phenomena and affordances produced by Euclidean geometric space, and a Newtonian conception of absolute and unchanging time. Jameson conjectures that it will take a future generation—whose habits of perception have been sculpted by postmodern time and space linked to Riemannian manifolds—to appreciate this new hyperspace.

In **opaque alienation**, the gaps between the formed habits of perception and the mutations of the **cultural** *habitus* are extreme and diffuse. Accelerated technologies transforming multiple sociological, cultural, psychological, political, and economic fields outdistance the capacity of the brain's neuromodulatory capacity to keep up, and, as a consequence, the subject experiences a schism between himself/herself and the new environment. Not only does the subject experience an imbalance and free-floating anxiety (*angst*), as in the case of Jameson, but also one may become clinically depressed, extremely hyperactive, and/or attentionally disabled. The feedback loop between perception and action has been broken; medication may become necessary to treat a very disabled individual.

24/7 (TWENTYFOUR/SEVEN) **24/7** refers to the state of laboring in **cognitive capitalism** in which **formal subsumption** has been replaced by **real subsumption**, in which every nick and cranny of our life is described by labor. As cognitarians we are working all the time. Indirectly through acting as hubs in a massively distributed communication networks. Directly by constantly producing new data through searches or displays of emotions on **Facebook**, Google, Spotify or any of the variety of travel and restaurant websites where our opinions generate ratings. **24/7** also refers to the recent book of Jonathan Crary of the same title in which he describes recent efforts by the military and other agencies to produce human subjects, especially military personnel who no longer need sleep yet remain productive, active and maintain a clear head. In **24/7**, he states, "The sleeplessness research should be understood as one part of a quest for soldiers whose physical capabilities will more closely approximate the functionalities of non-human apparatuses and networks."

TWITTER **Twitter** is an online social networking and news service where registered users can post and read "tweets": tweets are brief messages originally limited to 140 characters. In November 2017, character limits were doubled. **Fake news** stories about the **Pizzagate** scandal, for example, snowballed through posts distributed on **Twitter** and **Facebook**.

UMWELT ***Umwelt*** can mean *milieu*, situation, or, in its original German meaning, literally "environment"; as applied to semiotics, the term was first employed by the Baltic German biologist, Jakob von Uexküll, and later popularized by the Hungarian-American philosopher, Thomas Sebeok. It accounts for the set of perceptual experiences specific to a species, based on its "self-in-world," a subjective reference frame. An animal's ***Umwelt*** is a network of signs that are conspecific for its relation to the world based on sensory awareness. Each organism has a specific arrangement of complex sensory and motor apparatuses that provide it with information necessary for survival. The tick's ***Umwelt***, for example, is produced by three sensorial apparatuses and their stable interactions with the world:

> 1
> the odor of butyric acid,
>
> 2
> the temperature of the body of its prey,
>
> 3
> the hairiness of mammals.

Whereas an animals ***Umwelt*** is stable over generations human beings, through, for instance, art and architectural production, intervene and modify their ***Umwelt***. It is unstable and different for successive generations.

UNDERCOMMONS In Jack/Judith Halberstam's introduction to Stefano Harney and Fred Moten's ***Undercommons*** (2013), the writer states that the purpose of the formulation of the concept of the **undercommons** is to conceptualize a community based on a generalized refusal of rather than a desire for acceptance. Instead of asking for recognition for, for example, people of color, queers, transvestites, and other groups, rather instead, the "**undercommons**" seek to:

> take apart, dismantle, tear down the system that, right now, limits our ability to find each other, to see beyond it and to access the places that we know lie outside its walls.

In other words, it is a refusal of what has not been offered. The **undercommons** are, therefore, the refusal of the university of misery. In a rephrasing of Harney's and Moten's words, to enter the **undercommons** of the university is to enter the space of the broken and unassimilable, especially as it pertains to thought. Rather the aim of the **undercommons** is to rendezvous with an alternative not-yet-formed or recognized commons of a fugitive enlightenment created by criminal, matricidal, queer and refugee discourses that are, as of yet, not even formalized, but which are awaiting new environmental contingencies—currently in a state of stochastic dissonance—to be formed. This is what is meant by idea of the life stolen by the enlightenment and then stolen back; it is necessary to unlearn in order to become unfit for subjugation and subjection. As Harney and Moten state, "One cannot initiate the auto-interpellative torque that **biopower** subjection requires and rewards." If learning is, in fact, a political act that forms the techno-social-**cultural** *habitus*, which sculpts the brain's **neural plasticity** in the form of an epigenetic, ontogenic epiphenomenon that is the becoming brain, it would, therefore, tune its valences and synchronize its potentials into a new neural architectonic structure. This notion of the **undercommons** is surely a call for a kind of mental decolonization. The brain, after all, is simply a machinic agent at the disposal of the culture it is coeval with. The neural common is the material site of conflict and resolution between the

forces of institutional subjection and loci of alternative **autonomy**, of which the **undercommons** is an example. Following the lead of Gilbert Simondon, this glossary argues that the formlessness of the pre-individual contains within it the capacity for the concretization of the **undercommons** molded from a fragmentary assortment of meaningful possibilities; this is only possible if the politico-linguistic-**cultural** conditions allow for an alternative form of neural sculpting from the **pluripotentiality** of the **primary repertoire**.

VALORIZATION In the experience economy added value is tacked on to the revenue generated by a product. In their famous article "Welcome to the Experience Economy", B. Joseph Pine II and James H. Gilmore, (1998) understand that experience is as real as any offered service, good or commodity. Furthermore, that the significance of an experience is directly related to it its unforgettable quality and traces it etches into ones **memory**. The experience becomes memorable and as a result engages the mind in unique ways.

Pine and Gilmore think of experiences across two dimensions important for us here. First they depend on the degree to which customers participate in producing the experience. The degree of participation is not binary and exists along a continuum as even passive viewers can generate a context that makes the experience more vivid for others. Secondly the quality of the experience is related to environmental relationship uniting the customers or performers in the event and characterized according to two extremes; connection and absorption.

Memories and their action in the theater of the imagination of **the mind's eye** or in **working memory** become key elements in **valorization**. For full value is not completed at the end of the production cycle, but rather in the mind's **working memory**. Memories are

recalled and used in visualized scenarios constructed in **the mind's eye** as part of cognitive laboring. For example, the manufacture of a product is just the initial step which is followed by a directed public relations and advertising campaign, occurring first in the sphere of the Internet and then—through the process of **internalization**—in the mind/brain. According to Fumagalli and Lucarelli, the commodity transitions from a state of **commodity fetishism** to symbolic fetishism through the **valorization** of language itself. As a symbol constituted in language, it gathers an undue amount of attention. For instance public relations and advertising generate valor rather than value after the product is released into the global market place. In **neural capitalism** the dispositions of cortical processing are engaged as attention is transformed into salience. Top-down synchronous discharges originating in the prefrontal cortex intensify the importance of certain inputs.. (Engel 2001) The **saliency** economy is more powerful than the attention in the **valorization** economy as the desire for the commodity is intensified beyond the purported rationality of the market. This is analogous to a video on YouTube going viral or the ways and means that an artwork develops charisma. If the art collectors Susan and Michael Hort or Don and Mera Rubell purchase the art of a young unknown artist at an art fair a **buzz** results that circulates the inner confines of the VIP lounge creating first increased attention and then increased valuation. This **buzz** can be further intensified by articles appearing in the New York Times. This notion is consistent with what Moulier-Boutang asserts in his book, ***Cognitive Capitalism***, where he states that one of the most important elements of this form of capitalism is producing agreement and prognosticating the future direction of public opinion. "We shall see that the formation of common opinion on a wide variety of subjects, including the political system

of democracy, is at the base of **cognitive capitalism** because it is the foundation of economic models of the free (*du gratuit*) within the market economy." (Moulier Boutang 2011)

VARIATION **Variation**, in the present context, describes adjustable populations of nervous elements, and undetermined, or labile, potential **synapses** which give the brain the capacity to interact with an equally variable **cultural** *habitus*.

As Joaquin Fuster, in his book, *The Neuroscience of Freedom and* ***Creativity****: Our Predictive Brain* (2013), suggests, it is in this **variation**, inherent in the nervous system, that the capacity for freedom in the human mind resides. In a variable population of **neurons** with variable characteristics, there occurs differential amplification of those elements most in sync with the environmental contingencies, and those that are least connected which undergo cell death, or **apoptosis**. Amplified populations are selectively stabilized and go on to form connections with other like-selected populations of neural elements, which result in the building of the brain's architecture. What produces this variable environment? Art, architecture, cinema, **poetry**, and, now, Internet art all represent sources of disparity and difference. However, one should not underestimate the power of postcolonial thought, feminism, queer theory, decolonization operating on the above formations to produce new concatenations, networks of attention, ***gestalts***, and affordances, all of which call out in different ways to variable populations of **neurons** and their material and emergent neural plastic relations.

VIRTUAL REALITY (VR) **Virtual reality (VR)** is a three-dimensional, computer-simulated world created by specialized software that can be interacted with perceptually by human beings in a seemingly "real" way by the use of specialized goggles and helmets. At present, **VR** is used for training and education as well as for the 3-D display of imagined environments as part of games or interactive stories, and even in medical contexts as well.

In its first renditions, **VR** was mostly visual and auditory. Today, it is more immersive with programs that allow for taste and touch. **VR** 2.0 will likely include a form of "neuroreality" in which these virtual technologies interface directly with the brain by using brain-computer-interface technology—first used to aid so-called "locked-in" paraplegics to feed themselves by means of a robotic arm tethered to a computer screen and controlled by brain activity. In 2013, the physicist, Dan Cook, developed a project known as EyeMynd the goal of which was to create **VR** systems controlled by one's thoughts using external brainwave detecting gear. The Boston-based start up, Neurable, the bioinformatics company, EMOTIV, and **Facebook** all are working on similar technological devices that will, one day, in theory, allow us to interact in virtual environments with our thoughts as they are transmitted by external headsets. Helmet-based technologies, however, are increasingly obsolete. The Tesla CEO, Elon Musk, has recently founded a project called Neuralink, which seeks to connect a person's brain to the Internet *via* implantable electrodes. This, and other systems like it, will no longer depend on our sensory organs for the simulated experience, but, potentially, will trigger different parts of our brain directly. This is a true manifestation of the concept of "post-**phenomenology**." So real will this experience be that the differentiation between this simulated world and the external "real" one will be impossible. The future world of Neuralink, and other schemes like it, will bring the nightmare of total subsumption or **neural subsumption** into reality (both virtual and analog). Thus, the future **cognitariat** will labor with their brain waves instead of their bodies.

WORKERISM **Workerism**, also known as *operaismo* or Autonomist Marxism, is a social theory emphasizing the power of the **working class**. It evolved in the early period of post-war Italy and was first espoused in the journals, *Quaderni Rossi* (edited by Raniero Panzieri and Mario Tronti) and *Classe Operaia* (edited by Tronti, Antonio Negri, and others). A number of powerful intellectual concepts arose from these journals; concepts such as the **social factory** and the refusal to work were joined by Tronti's inversion of struggles.

In "Autonomist Marxism and the Information Society" (1994), Nick Dyer-Witheford refers to Yann Moulier-Boutang's so-called "Copernican inversion" of post-war Marxism to comprehend this seismic shift in understanding workers' struggles. Workers provoke capitalist development. In fact, capitalism's reactions to its "other"—to its dyadic counterpart—provide the impetus for it to perfect itself. For instance, Sylvère Lotringer in his essay, "We, the **Multitude**" (2005), states, "[i]t was the Italian workers' stubborn resistance to the Fordist rationalization of work, and not mere technological innovation that forced **capital** to make a leap into the post-Fordist era or immaterial work."

WORKING CLASS Key to understanding the role of the **working class** in the new economy is an understanding of how the meaning of the term has mutated. In its original meaning, as described by Karl Marx, the **working class** or **proletariat** had to sell their labor power. This was distinguished from the bourgeoisie who owned the means of production via their capacity to use and deploy capital. In Marx's time, the **working class** was primarily composed of workers operating in industrial contexts where manual labor was often a distinguishing feature of their laboring practice. As Michael Hardt and Antonio Negri write, in their book ***Multitude: War and Democracy in the Age of Empire***, recent shifts in the global economy have displaced the industrial **working class** from its historic position. Laboring has increasingly shifted from the production of material goods, to that of the immaterial production of subjectivity itself. **Affect**, emotions, and communication, once beyond the capacity of capitalism to commoditize, are now in its cross-hairs. According to Hardt and Negri labor itself, tends, through the transformation of the economy, to create, and be embedded in, cooperative and communicative networks, and the **multitude** is its agent for dissemination and distribution. In fact according to Paolo Virno, in *The Grammar of the **Multitude***, today's "**multitude**" or Internet laborer's entire life is consumed by performing a living labor **24/7**. Virno writes: "Today all the **multitude** does is monitor signs on a screen. But machines are not 'dead labor' anymore, they are part of the workers' life [...]."

Key to this revolution is the notion of "the common" which is central to social production and depends on common knowledge being passed down and distributed through the tributaries of the World Wide Web (WWW) upon ubiquitous screens, to and from others, creating new knowledge in its wake. The WWW and the common in combination are the perfect *dispositif* to tether and normalize the **multitude**, a task that formerly had been impossible.

WORKING MEMORY **Working memory** is the temporary activation, maintenance, and manipulation of data arriving from the senses, or activated from long-term **memory** stores, to maintain the presence of information consciously in mind while using it to perform a particular task. It is sometimes confused with short-term **memory**, but, as the term **working memory** implies, it is a process that works with **memory** for a limited period of time in **the mind's eye**. **Working memory** is usually active for less than a minute and has limited capacity as to the

number of mnemonic entities it can juggle at any one time. According to Mark D'Esposito et al. in their article, "The Neural Basis of the Central Executive System of **Working Memory**" (1995), **working memory** is predominantly under the control of the prefrontal cortex, especially when it is involved in goal-directed behavior and the integration of visuospatial and verbal tasks.

One of the earliest models of **working memory** was devised by Graham Hitch and Alan Baddeley which was composed of three components; the central executive, the phonological loop, and the visuospatial sketchpad. The central executive acts a supervisory system conjoining with the phonological loop, which stores verbal and sound content necessary, for instance, in learning one's lines for a play; the visuospatial sketchpad is, perhaps predictably, better adapted to the display of visuospatial data. The notion of the "episodic buffer" was added later by Baddeley, and in his conception, it temporarily integrates information from the phonological loop and the visuospatial sketchpad with long-term **memory**. The term **working memory** is also used in the world of computing to designate an area of high-speed **memory** used to store programs currently in use.

In **cognitive capitalism**, where the mind and brain are the new factories of the 21st century, **working memory** takes on additional importance and represents a key site of mental laboring, both presently and, most notably, in the future.

XENOFEMINISM According to Helen Hester, in her talk, "Alien Futures: **Xenofeminism** as Ecopolitics" (2016), the **xenofeminism** (XF) project is a technomaterialist, anti-naturalist, and **gender** abolitionist form of feminism. It takes a critical perspective on technology's effects on feminism and examines how feminists might use or appropriate technology for their own ends; pharmaceuticals, 3-D printing, and open-source software are seen as potential tools for the queer left. **Xenofeminism** does not support technological determinism; instead, it foregrounds resistance. It is anti-naturalist because it regards **nature** as inherently political—always presenting an area of contestation. Here, Haraway's **cyborg** is a key background element (since her **Cyborg** essay from 1985 was of course a feminist essay, about refusing a **nature**/technology divide). **Embodiment** is not static, **Xenofeminism** argues; it is open to change. Biology is not destiny; it can be transformed through reproductive justice and is fundamentally mutable. The concept of **gender** abolitionism is central to **Xenofeminism**, as it seeks to eradicate injustices resulting from the idea of binary **gender** identity. There is a clear relationship between **Xenofeminism** and theories relating to the **gendered brain**.

YELLOW JOURNALISM or YELLOW PRESS **Yellow Journalism** is considered an early example of **fake news** that reached a fever pitch in the late 19th century. It was characterized by salacious and sensationalist news stories peddled as facts for the purpose of influence and profit. The name derives from a comic strip entitled *Hogan's Alley* that depicted New York City slum life in the late 1800s. The comic, drawn by Richard Outcault, came to be known by the name of a popular character, the Yellow Kid. The phenomenon reached its apex in the period preceding the Spanish American War when *The New York World,* owned by William Randolph Hearst (who won a bidding war to run Outcault's strip and, thus, increased the paper's sales on the back of The Yellow Kid's popularity), and *The New York Journal*, owned by Joseph Pulitzer, used outright lies to stoke anti-Spanish sentiment in order to sell more copy. Although his name is associated with the highest merit in newspaper journalism, an impressive **fake news**

achievement in its own right, Joseph Pulitzer was, in fact, a pioneer of yellow or "tabloid" journalism. In **cognitive capitalism**, **fake news** and **yellow journalism** are part of **communicative capitalism** and apparatuses of **valorization** in the **attention economy**.

YELLOW VEST (GILET JAUNE) The **Yellow Vest** or (**Gilet Jaune**) is a highly visible piece of clothing normally used as a symbol of a hazard or breakdown on the highway which is easily visible and reflective. As such it was the perfect symbol and conceptual uniform of rebellion and visible solidarity of those revolting against rising fuel costs and income disparity in France. Worn by a growing **multitude** of dissatisfied protestors. As Vanessa Friedman states in the *New York Times* of December 4th 2018, "The **yellow vest** is immediately visible in all of the pictures of the protests, peaceful or not, and impossible to miss even on the small screens of social media. It is easy to slip on over any outfit, and instantly transformative. It is widely understood as a distress signal." It was so successful that the government of France rolled back the fuel prices.

YOLO **YOLO** is an acronym widely used online standing for the expression "you only live once." While the phrase is familiar, an online culture, particularly centered around online **poetry** communities and the blogging website, tumblr, began using #**YOLO** as a way of denoting a specific worldview and lifestyle. Writing in the alt-lit anthology, *The **YOLO** Pages* (2014), the editors write that "***YOLO*** philosophy" is "meant to invoke a 'carpe diem' impulse that goes back through over 2,000 years of literature." The editors explicitly connect **YOLO** to a famous line by the Latin poet, Horace: "carpe diem, quam minimum credula postero" (seize the day, trusting as little as possible in the next). **YOLO** culture, and tumblr culture more generally, has been an engine for highlighting aspects of structural oppression (particularly advocating for feminism, and anti-ableism); the site serves as a contrast to the foment of rightist and nationalist **cultural** production on sites like YouTube, **4chan** and Reddit. **YOLO**'s popularity on the Internet has penetrated even unlikely spaces, including Islamic State in Iraq and Syria (ISIS/ISIL) recruiting sites which referenced **YOLO** with a darker analogue: YODO (you only die once). ISIL YODO **memes** emphasized the importance of martyrdom as a means of making one's death meaningful.

ZEITGEIST **Zeitgeist** is a term associated with the German philosopher, Georg Wilhelm Friedrich Hegel, although he actually never used the term. The word derives from the German *zeit,* meaning "time," and *geist,* meaning "spirit" or "ghost." For Hegel, *geist* includes both intelligence and will, and the concept of the spirit entails freedom from oppression and from sensual seductions. The term was borrowed into the English language and now is no longer generally italicized as a foreign word despite remaining unchanged in spelling or pronunciation from the original German.

The term has come to be used to mean the "spirit of the age," the combination of social, political, cultural, psychological relations that—although immaterial and "ghost-like"—influence the climate of an era in which subjectivity is formed. It is this **zeitgeist**, the theory suggests, that encourages the **cultural** production of its time. This dynamic creates **cultural** memories left as signs of those discourses upon the skin of architecture, the history of technological invention, and as the incremental changes that characterize the history of painting (as exhibited in museums). It is this history of change that creates a reactive and coevolving **cultural** field and influences the spirit of future generations, i.e. the next **zeitgeist**. This is the key to the concept of a **zeitgeist**, for it is not only of its own

time, but it expresses a sense of immanence for what is to come. This goes to the heart of Hegel's statement in *Lectures on the Philosophy of History (Vorlesungen über die Philosophie der Weltgeschicht)* (1837), that no man can overleap his own time, for the spirit of his time is also his spirit. This might be mistaken for a statement of radical historicism in which all claims, even those in philosophy, are only true (or most true) in their own time. Rather, for Hegel, each time period, and its unique spirit, is a stage in the ontogenetic development of the world spirit itself, meaning a particular **cultural** step in humanity's long struggle to come to consciousness of itself.

I would like to suggest that the **zeitgeist** is the culmination of generational effects first operating upon the socio-**cultural** field, and then, upon the brain's **neural plasticity**. Just as the **zeitgeist** is an important force in the production of new forms of art and architecture, it is also important in producing new shapes of epigenetically-fashioned forms of dynamic neural architectures. These can be normalizing in the hands of institutions promoting religious or political dogmas, or emancipating when emanating from autonomous artistic and architectural sources. Through the trans-generational cumulative effects of these different forms of **cultural memory**, left on the battlefield of **cultural** production over time as residues, distributed synaptic efficiencies are stabilized over individual brains and populations of brains. In concert, the world spirit is formed.

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WARREN NEIDICH trained in art, architecture, neuroscience, and medicine, and uses neon-light sculptures to create cross-pollinating conceptual text-based works that reflect upon situations at the border zones of art, science, and social justice. Recent awards include Stiftung Kunstfonds NEUSTART KULTUR (2020 and 2021), Hauptstadtkulturfonds (2021), and Katalogförderung des Berliner Senats (2017). His performative and sculptural work *Pizzagate Neon* (2018), recently on display at the Venice Biennale 2019, analyzed through a large hanging neon sculpture the relations of fake news, the networked attention economy, the evolving techno-cultural habitus, and the co-evolving architecture of the brain. He was a tutor in the Departments of Visual Art, Computer Science, and Cultural Studies at Goldsmiths College, University of London (2004–08) as well as recently serving as Professor of Art at Weissensee Academy of Art, Berlin (2016–18). He is founder and Director of the Saas-Fee Summer Institute of Art (2015–), a theory-intensive postgraduate course. He has been a visiting lecturer in the Departments of Art at Brown University, GSD Harvard University, Columbia University, Princeton University, Southern California Institute of Architecture, and University of California, Los Angeles in the US; the Sorbonne in Paris, France; and the University of Oxford and Cambridge University in the UK. His work has been the subject of over 150 magazine and newspaper articles, including the *New York Times, Time Magazine, Artforum, Art in America, Kunstforum International, The Art Newspaper, Smithsonian Magazine, The Chicago Tribune, Hyperallergic, Artnet, GQ, Forbes, Vogue IT, Monopol, Performance Art Journal, American Photographer, Time Out, The New Yorker, New York Magazine, Los Angeles Times, The Village Voice,* and *Frieze*. His *Glossary of Cognitive Activism (For a Not So Distant Future)* (2019) published by Archive Books is now in its third edition.

Written by Warren Neidich, Glossary of Cognitive Activism (For a Not so Distant Future) articulates key concepts central to the essays published in the three-volume series The Psychopathologies of Cognitive Capitalism. The series attempts to broaden the definition of cognitive capitalism in terms of the scope of its material relations, especially as it relates to the conditions of mind and brain in our new world of ad- vanced telecommunication, data mining and social relations. It is our hope to first improve awareness of its most re- pressive characteristics and secondly to produce an arsenal of discursive practices with which to combat it.

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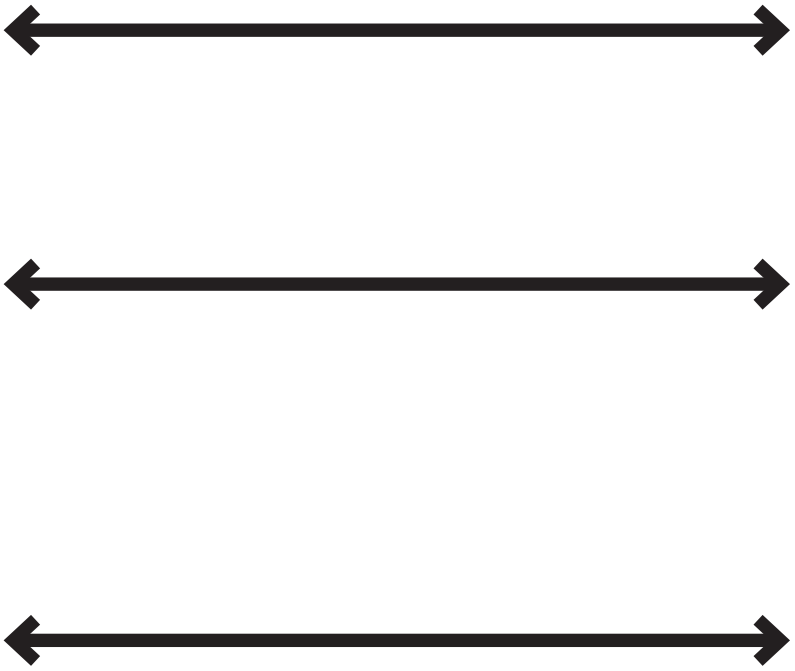

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